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1959

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[PUB. MAY 1962]

(Final issue of Vol. X)



AGRICULTURAL METEOROLOGY

(A Compilation of Backlog Abstracts for 1950-59)

Compiled by: Muriel F. Haas

Published monthly at Prince and Lemon Streets, Lancaster, Pa., by the AMERICAN
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INTRODUCTION

This third supplement completes Vol. X of *Meteorological Abstracts and Bibliography*. As in the case of the first: **Instruments and Observations** published in August 1961, and the second: **Precipitation and Hydrometeorology**, published in September 1961, this supplement is composed of unpublished abstracts of articles originally appearing in sources published during 1950-59. These supplements are not indexed in the annual indexes for Vol. X (1959).

The arrangement of material follows the general outline found in the *Agrarmeteorologische Bibliographie*, which is issued annually by the Deutscher Wetterdienst in Offenbach a/M, Germany.

Occasionally an article could fall in more than one of the groups. In such cases an arbitrary decision was made as to the most suitable category. It is hoped that the location of material that is pertinent to more than one field will be facilitated by the Alphabetical Subject Index.

This issue has been compiled and published with the aid of funds provided by the National Science Foundation for this specific purpose. The original abstracting was done under contract with AFCRC.

OUTLINE OF CONTENTS

- I. AGRICULTURAL METEOROLOGY
 - 1. Agricultural meteorology (general) (1-18)
 - 2. Agrometeorological data (19-24)
 - 3. Agrometeorological forecasting (25-29)
 - 4. Agrometeorological instrumentation and measurements (30-32)
 - 5. Agrometeorological research stations (33-34)
- II. LOCAL CLIMATOLOGICAL DATA, MICROCLIMATES
 - 1. Local climates (35-50)
 - 2. Agricultural climatology (51-62)
 - 3. Dry and arid climates (63-67)
 - 4. Microclimatology (68-75)
- III. SOIL CLIMATE
 - 1. Soil moisture (76-104)
 - 2. Soil temperature (105-110)
- IV. SOIL AND CLIMATE IMPROVEMENT
 - 1. Soil improvement, land planning, land cultivation (111-119)
 - 2. Irrigation (120-137)
 - 3. Wind protection, windbreaks (138-142)
 - 4. Greenhouse climate (143-146)
- V. PLANT GEOGRAPHY AND PHYSIOLOGY
 - 1. Plant phenology (147-173)
 - 2. Plant ecology (174-177)
 - 3. Plant physiology, anatomy (178-181)
 - 4. Growth, harvest, yield (182-183)
- VI. EFFECT OF CLIMATE AND ITS ELEMENTS ON PLANTS
 - 1. Climatic effects (general) (184-188)
 - 2. Photoperiodism, photosynthesis, radiation (189-201)
 - 3. Temperature (202-206)
 - 4. Wind (207-210)
 - 5. Atmospheric pollution (211-212)
 - 6. Frost and freeze damage (213-243)
- VII. PARASITIC PLANT DISEASES
 - 1. Animal vermin, pests, etc. (244-265)
 - 2. Plant bacteria, fungi, etc. (266-288)
- VIII. SPECIFIC CROPS
 - 1. Coffee (289-292)
 - 2. Corn (293-305)
 - 3. Cotton (306-314)
 - 4. Flowers (315-321)
 - 5. Fodder (322-329)
 - 6. Orchards
 - a. Orchards (general) (330-340)
 - b. Apples (341-342)
 - c. Apricots (343-344)
 - d. Cherries (345-358)
 - e. Citrus fruit (359-365)
 - f. Lychees (Litchis) (366-367)
 - g. Mulberries (368-371)
 - h. Peaches (372-380)
 - i. Pears (381-383)
 - j. Plums (384)
 - 7. Peanuts (385-392)
 - 8. Rice (393-443)

9. Strawberries (444-446)
10. Sugar beets (447-453)
11. Sugarcane (454-457)
12. Tea (458-460)
13. Tobacco (461)
14. Trees (462-467)
15. Vegetables
 - a. Vegetables (general) (468)
 - b. Beans (469-471)
 - c. Lettuce (472)
 - d. Peas (473-475)
 - e. Potatoes (476-484)
 - f. Radishes (485)
 - g. Tomatoes (486-490)
16. Vineyards (491-504)
17. Wheat, grains, and winter crops
 - a. Wheat (505-532)
 - b. Grains (533-547)
 - c. Winter crops (548-551)
18. Miscellaneous (552-566)
- IX. ATMOSPHERIC CONDITIONS AND ANIMALS AND INSECTS
 1. Animals (567-588)
 2. Insects (589-593)
- X. EPIDEMIC DISEASES OF ANIMALS (594-597)
- XI. ANIMAL AND INSECT PHENOLOGY (598-601)

AGRICULTURAL METEOROLOGY

AGRICULTURAL METEOROLOGY (GENERAL)

10N-1

551.5:63(54)

Basu, S., *Agricultural meteorology in India*. *Indian Journal of Meteorology and Geophysics* Delhi, 8(4):353-354, Oct. 1957. **DWB, DLC**—The Agricultural Meteorology Section (now Division of the Indian Meteorological Service) was started at Poona in 1932 under L. A. RAMDAS who guided it for 21 yrs. The present director, SHRI A. K. MALLIK, was one of RAMDAS' oldest collaborator. Various activities and accomplishments of the Division, the Central Agricultural Meteorological Observatory and its network of crop weather stations over the past 25 yrs are reviewed. *Subject Headings*: 1. Agricultural meteorology 2. Poona, India. I. Ramdas, S. A. K.—M.R.

10N-2

551.5:63(439.1)

Dési, Frigyes, *A meteorológiai ismeretek hiányának káros hatása mezőgazdasági termelésünkben*. [Undesirable consequences in crop production due to lack of meteorological knowledge. *Időjárás*, Budapest, 60(3):129-136, May/June 1956. Russian and English summaries p. 129. Also: Ravasz, Tibor, *Néhány szó a meteorológia és az agronómusok kérdéséről*. [Comments on the problem of meteorology for agronomists.] *Ibid.*, 60(4):253-254, July/Aug. 1956. Also: Kulcsár István, *Megjegyzés a meteorológia és az agronómusok kérdéséhez*. [Comments on the problem of meteorology for agronomists.] *Ibid.*, 60(5):307-309, Sept./Oct. 1956. **DLC**—Meteorological knowledge is necessary in various phases of agricultural activity (climatic amelioration, agricultural planning, introduction of new crops, etc.). Also there should be special agrometeorological network frost warning services and agricultural weather information and forecasting services. All these are lacking in Hungary or have not been developed to a satisfactory level. *Subject Headings*: 1. Agricultural meteorology 2. Hungary.—G.T.

10N-3

551.5:63(93)

Eikhhfeld, I. G., *Pobeda poliarnogo zemledeliia*. [The victory of Polar agriculture.] (In *Vsesoiuznaia Akademiia Sel'skokhoziaistvennykh Nauk imeni V. I. Lenina, Sel'skokhoziaistvennaia Nauka v SSSR*, ed. by A. S. Bondarenko. Moscow, Gos. Izdat Kolkhoznoi i Sovkhoznoi Lit. 1934. p. 177-190. 5 figs.) **DLC**—The earliest agricultural experiments in the Polar zone were made in the Murmansk region at 67° lat. in 1923. The frost free period at this place is only 90 days long, and at the soil surface the night frosts are absent only for 55-60 days. The mean temperature of the period June-Sept. is 10°C and the sum of mean temperatures 1200°C. Using various agricultural techniques and fertilizers, good results have been achieved with barley, which requires 1600° usually, with peas requiring 2100° and potatoes, requiring 1600°. *Subject Headings*: 1. Arctic agricultural meteorology 2. Murmansk Region, U.S.S.R.—N. A. Sikeev.

10N-4

551.586:63:061

Halstead, Maurice A.; Thom, H. C. S.; Went, F. W. et al., *Panel discussion on whether weather, climate, and agriculture*. *Agriculture Research Institute, 6th Annual Meeting, Oct. 14-15, 1955, Wash., D. C., Proceedings*, pub. 1958. p. 60-75. (*National Research Council, Wash., D. C., Publication 576*.) **DWB** (630.62 A278p)—HALSTEAD discusses the importance of micrometeorological research and observations for agriculture, and of specific aspects of micrometeorological research (evapotranspiration, turbulent exchange, rainfall, heat exchange) and suggests the need for team approach, proper equipment and continuity. H. C. S. THOM discusses analysis of agroclimatic data

W. WENT the basic concepts of crop climate studies and the use of the phytotron at the Earhart laboratory and SHAW the data requirements not only from meteorologists but from physiologists, agronomists, etc. VAN BAVEL discusses water requirements and soil, crop and weather relations, P. E. WAGGONER the role of the climatologist in an agricultural experiment station or in agrometeorological studies. M. M. KELSO summarizes the problem, especially as it concerns work done at Montana Agriculture Experiment Station, and mentions the need for a phytotron costing initially about \$1 million and with operation costs of \$250,000 a year. Such a center with costs as given above is being developed at Purdue, according to N. J. VOLK. RAY BAINER of Davis, Calif., mentions work done there and H. E. LANDSBERG the need for regional compilation of literature references in agrometeorology. *Subject Headings:* 1. Agricultural meteorology 2. Phytotron seminars. I. Shaw, Robert H. II. van Bavel, C. H. M. III. Waggoner, Paul E. IV. Kelso, M. M. V. Volk, N. J. VI. Landsberg, H. E.—M.R.

10N-5

551.5:63:05

Institut National Pour l'Etude Agronomique du Congo Belge, *Bulletin d'Information. Informationsbulletin*. v. 1, no. 1, Jan. 1952. Brussels, pub. by the Belgian Govt., 1952. Latest issue no. 8(6), 1959. Issued with Belgium Ministère des Colonies. Direction de l'Agriculture, des Forêts, de l'Elevage et de la Colonisation, *Bulletin Agricole du Congo Belge*. Separate paging. Quarterly; beginning 1953, bi-monthly. In French; t-p. in French and Flemish. DWB, DLC. *Subject Headings:* 1. Serial publications 2. Agricultural meteorology 3. Belgian Congo.

10N-6

551.586:63(477)

Lapa, I. Z., *Razvitie agrometeorologicheskikh issledovanii na Ukraine*. [Development of agrometeorological research in the Ukraine.] Kiev, Ukraine. *Ukrainskii Nauchno-Issledovatel'skii Hidrometeorologicheskii Institut, Trudy*, No. 5:36-50, 1956. 24 refs. DWB, DLC—As a separate branch of meteorology, agrometeorology took shape in Russia in the 1890's under the influence of I. I. VOEIKOV, the outstanding Russian climatologist and geographer. By the end of the 19th century there were already about 100 2nd class meteorological stations in the Ukraine. In 1956 there were 207 hydrometeorological stations, 834 posts of the Hydrometeorological Service, and 1366 agrometeorological observation points at collective and state farms and machine-tractor stations. *Subject Headings:* 1. Agricultural meteorology 2. Ukrainian S.S.R.—A.M.P.

10N-7

551.577.37 551.515.3(766,781)

Ludlum, David M., *Late spring favors the farmers*. *Weatherwise*, Boston, 8(4):104-106, Aug. 1955. 4 figs. DWB, DLC—First favorable spring in 5 yrs as far as agricultural prospects were concerned. Drought was ended in southwest by 2-10 in. of rainfall in May and 2-6 in. in June. May was warm in east and cold in west. June cold all over United States. On May 25, a bad tornado situation occurred in North Central Oklahoma, at least 15 tornadoes occurred in a 200 sq mi area and over 100 persons were killed and 300 hospitalized, with damage in millions, in spite of accurate warnings (it was a classical set-up). At Blackwell, Okla., 20 people were killed. At Udall, Kans. (25 mi SE of Wichita, population 600), every home and public building was demolished. *Subject Headings:* 1. Wet springs 2. Tornadoes, Oklahoma (May, 1955) 3. Udall, Kans. 4. Blackwell, Okla.—M.R.

10N-8

551.586:63(47)(09)

Maksimov, Sergei Andreievich, *Iz istorii agrometeorologii XVIII-XIX vekov*. [The history of agrometeorology in the 18th and 19th centuries.] *Meteorologiya i Gidrologiya*, No. 12:49-51, Dec. 1959. fig. DWB, DLC—The first Russian agriculturist A. T. BOLOTOV (1738-1833) carried out meteorological observations during 50 yrs. His major attention was given to weather effects on growth and development of plants. General program of his work and that of others (I. M. KOMOV, A. I. VOEIKOV, etc.) are briefly outlined in the text. The meteorological conditions in the south for planting of tea and corn were studied by VOEIKOV in 1882. The first meteorological system was organized in 1886 for the southwestern services and in 1891 the first *Meteorological Herald* was published by The Geographic Society. General activities of the Ministry of Agriculture and Meteorological Bureau are described with an account of major problems. *Subject Headings:* 1. Agricultural meteorology 2. U.S.S.R.—N.P.S.

10N-9

551.586:63

Mattos, Roque R., *Tiempo, clima y producción*. [Weather, climate and production.] *Revista Orientación Meteorológica*, Montevideo, No. 8:38-40, Sept. 1955. DWB, DPU—A brief discussion pointing out the advantages of knowledge of weather and climate. This knowledge, it is explained, helps to determine where and when to plant and thus production often is greatly increased. *Subject Headings:* 1. Weather and agriculture 2. Climate and agriculture 3. Agricultural meteorology.—E.Z.S.

10N-10

551.5:63(497)

Post, J. J., *Indrukken van Joegoslavië op een landbouwmeteoroloog*. [Impressions of Yugoslavia of an agricultural meteorologist.] *Hemel en Dampkring*, The Hague, 53(11):199-200, Nov. 1955. photo. DLC, DWB—Owing to its considerable independence of the Yugoslav Hydrometeorological Service, agricultural meteorology is differently developed in the several provinces. Agricultural meteorology is limited by the absence of adequate climatic data for the country. A warning service against *Peronospora* (a grapevine mold) has been organized. An attempt is being made to develop in Slovenia, a warning service for the potato blight. The author discusses briefly some agrometeorological problems presented in Yugoslavia, some of the activities carried on by the government in this field, etc. *Subject Headings*: 1. Agricultural meteorology 2. Agrometeorological services 3. Yugoslavia.—I.L.D.

10N-11

551.586:63(49)

Primault, B., *Problèmes actuels de météorologie agricole*. [Present problems of agricultural meteorology.] *Schweizerische landwirtschaftliche Monatshefte*, Berne, 36(4):143-145, 1958. DA4—The author summarizes some agricultural problems in Switzerland where collaboration with the Swiss Meteorological Institute would be of great value. *Subject Headings*: 1. Agricultural meteorology 2. Switzerland.—A.V.

10N-12

551.5:63:06(55)

Ramdas, L. A. (*Met. Office, Poona, India*), *Report on the progress of agricultural meteorology in India*. *Pan Indian Ocean Science Congress*, 2d, Perth, Western Australia, Aug. 1954, *Proceedings of Section A, Physical Sciences*, (pub. 1958?). p. 52-57. DWB (506.35 P187pr)—A review of the progress in agricultural meteorology in India since 1932 as observed by the Indian Council of Agricultural Research and the Division of Meteorology. Investigations on the various meteorological factors that affect crops, heat and water balance, made since 1943, are discussed. *Subject Headings*: 1. Agricultural meteorology 2. India.—N.N.

10N-13

551.5:63(436)

Roller, Maria, *Agrarmeteorologische Dekadenberichte aus Österreich*. [Decadal agrometeorological report from Austria.] *Wetter und Leben*, Vienna, 8(5/7):110-113, 1956. 6 refs. DWB—The author describes briefly the contents of the various agrometeorological reports, published in Austria both by the central government and by the provinces, which were initially begun in 1932 under the direction of W. SCHMIDT and V. CONRAD, and then discusses the agrometeorological decadal reports which were begun in 1955. Each of these consists of a short weather report, annual decadal values and the individual and decadal mean values of air temperature, relative humidity, soil temperature at various depths, soil moisture in percent of pore volume at corresponding depths, precipitation, sunshine duration, evaporation, hoar frost and dew. The preparation of the reports is described and their contents for 2 yrs are outlined. *Subject Headings*: 1. Agrometeorological decadal reports 2. Austria.—I.L.D.

10N-14

551.586:63:551.585.55(47)

Rudnev, G. V., *Voprosy agrometeorologii v zemledelii stepnykh i lesostepnykh raionov SSSR*. [Agrometeorological problems of interest to farmers in the steppe and forest-steppe regions of the U.S.S.R.] *Meteorologiya i Gidrologiya*, Leningrad, No. 4:43-46, April 1959. DWB, DLC—At a visiting session of the All-Union Lenin Academy of Agricultural Sciences held in Saratov in October 1958, the problems of introducing scientific methods into the agriculture of the steppe and forest-steppe regions were considered. In a series of papers technical measures based upon agrometeorological principles were presented. These papers are summarized by the author: **Problems of steppe agriculture and increasing the yield of agricultural crops** (M. A. OL'SHANSKIĭ) deals with the basic characteristics of drought and measures for overcoming the lack of correspondence between moisture requirements and availability in the soil. From the viewpoint of agricultural meteorology the introduction of fallow cultivation of crop rotation in steppe agriculture is very important and the solution of the problems involving the use of either clean or littered fallow depends upon water content of the soil. In the paper **Droughts in the U.S.S.R. and scientific means of combating them in the natural zones**, F. F. DAVITAIA showed that the value of clean fallow is not uniform in different natural zones. In deserts with small amounts of rainfall (70 mm) and with large potential evaporation (1200 mm) and also in northern regions with excess moisture the role of clean fallow is slight. The problem of soil moisture regime in regions of insufficient moisture involves the study of the soil structure and the movement of soil moisture and was discussed by N. S. SOKOLOV. He examined the problems of soil moisture, surface runoff and snow melt in relation to water erosion of soil and he showed that each 10 mm of melt water retained on a field provides an additional centner of grain. The Academy's discussion also included further development of methods of snow surveys and of melt water retention, further study of the conditions leading to the recurrence of dust storms, studies

on wind erosion, hydrotechnical problems of estuary irrigation in Kazakhstan, shelter belt development, etc. *Subject Headings:* 1. Agricultural meteorology 2. Steppe farming 3. U.S.S.R.—I.L.D.

10N-15

551.5:626.84

Schonnopp, G., *Berechnungswirtschaft, Klimaforschung und Wetterdienst*. [Watering, climate and weather service.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:426-429, 1952. 18 refs. DWB—A climatic basis is necessary for planning agricultural watering operations. A phenological climatology would be useful and agricultural meteorologists should instruct their clients systematically about watering. *Subject Headings:* 1. Crop watering 2. Agricultural meteorology.—C.E.P.B.

10N-16

551.5:63(04)

Shortridge, N. H., *The farmer and the weather*. *Hoosier Farmer*, Spencer, Indiana, 39(3):12-13; 45, March 1954. DWB—A popular article reporting on the service to agricultural interests recently inaugurated by the U. S. Weather Bureau at its central office, and on the specialized work in relation to agricultural experiments, which is going on at Purdue Univ., Ind. *Subject Headings:* 1. Agricultural meteorology 2. Purdue Univ., Ind.—M.R.

10N-17

551.586:63

Tamhane, R. V., (*Indian Agric. Res. Inst., New Delhi*), *Land utilization and soil studies*. *Science and Culture*, 18(6):272-274, Dec. 1952. 2 refs. DLC—Author, *inter alia*, demands in this general discussion intensified climatological research from the aspect of agricultural risk. *Subject Heading:* 1. Agricultural climatology.—A. Assur.

10N-18

551.5:63:061.1(47)

Ulanova, E. S., *Osnovnye formy i metody agrometeorologicheskogo obsluzhivaniia sel'skogo khoziaistva v SSSR*. [Principal forms and methods of agrometeorological service for agriculture in the U.S.S.R.] (In: U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby, *Voprosy agrometeorologii*, ed. by F. F. Davitaia and M. S. Kulik. Moscow, 1958. p. 22-24.)—Every ten days the agrometeorologists of the Central Institute of Forecasting obtain data on the conditions and developmental phases of crops from 1790 stations; from 1200 stations, reports on soil moisture and from 2500 stations, reports on temperature, precipitation, snow, etc., are reviewed. About 400 stations carry out observations on soil temperature of winter crops in winter. The principal source of agrometeorological information is **Principal decadal agrometeorological characteristics**, which contains data on agrometeorological characteristics of various crops, forecasts and meteorological summary. Current reports are issued on various questions. Another form of service is the agrometeorological 30-day forecasts including agrometeorological growth and development conditions of winter crops during fall, supplies of productive moisture in soil, dates of ripening of crops, etc. The determination of optimum, early and late dates of sowing and condition of winter crops during interruption of vegetation in fall is based upon methods giving the relationship of germination, stalk formation, etc., upon temperature and productive soil moisture. The methods used are those developed by A. A. SHIGOLEV, N. A. ZUBAREVYI, etc. Forecasts of agrometeorological conditions of winter crops are made by methods for computing minimum soil temperature at depth of the stem formation, etc. (V. N. PEREGULOV, A. M. SHUL'GIN, etc.). Production moisture supplies are computed by the methods of L. N. RAZUMORSKIY and A. V. PROTSEROV. Phenological forecasts are prepared on the basis of index of temperature sums necessary for the onset of particular developmental phases. *Subject Headings:* 1. Agrometeorological services 2. U.S.S.R.—I.L.D.

AGROMETEOROLOGICAL DATA

10N-19

551.579.5:63(548.6)

*†Beifrom, S. G.; Garmonov, I. V. et al., *Podzemnye vody Altaiskogo Kraia i ikh rol' v sel'skookhoziaistvennom vodosnabzhenii (bez Gorno-Altai'skoi AO)*. [Ground water of Altai Territory and its role in the water supply to agriculture, not including the Gorno-Altai Autonomous Oblast.] *Osobaia Kompleksnaia Ekspeditsiia po Zemliam Novogo Sel'skokhoziaistvennogo Osvoeniia, Trudy*, Vol. 1:99-134, 1958. 4 figs. (1 fold), 37 refs. DWB—An extensive hydrological study of the Altai region and its separate parts with reference to utilization of ground water in agriculture. Includes detailed geological cross-sections and good bibliography. *Subject Headings:* 1. Ground water 2. Agricultural hydrology 3. Altai Territory, U.S.S.R. I. Mikhailova, E. V. II. Ivanov, A. V. III. Filamov, F. V.—M.R.

10N-20

551.5:63

*Georgieva, Ia. M., *Vuzmozhnosti za bezpolivno otglezhdane na zelenchutsi vi dobruzha*. [Possibilities for vegetable growing without irrigation in Dobruja.] *Khidrologiia i Meteorologiia*,

Sofia, No. 3:57-60, 1956. 7 tables. **DLC**—Monthly averages of relative humidity, temperature, precipitation and wind velocity (1941-1953) are presented for Bazargic, as well as crop results of some vegetables. Natural growing conditions in Dobruja for a number of vegetables are discussed. Effects of shelter belts are considered. *Subject Headings: 1. Agrometeorological data 2. Vegetables. 3. Dobruja, Hungary.—G.T.*

10N-21

551.586:63(54)

*India. Meteorological Dept., **Weather and the Indian farmer**. Delhi, 1946. 12 p. 20 figs. **DWB**—Characteristic features of Indian weather and climate such as floods, droughts, storms, frosts, hazard, heat waves, etc., are described and illustrated by general charts and sample diagrams. The effects of weather factors on crops and damage caused by weather calamities are discussed and shown in photographs. Measures taken against frost, wind and other hazards are mentioned and charts showing frequency of these hazards presented. One section describes the weather bulletin (prepared for the benefit of farmers by the Indian Weather Services). The pamphlet includes a description of the **Crop-Weather Calendars** issued for each principal crop and each district by the **Agricultural Meteorologist**. Sample sheets of the calendar are presented. *Subject Headings: 1. Agrometeorological data 2. Weather damage 3. India. I. Banerji, Sundhansu Kumar.—G.T.*

10N-22

551.586:63 551.506.8(436)

*Lauscher, Friedrich and Roller, Maria, **Ausarbeitungen für die Praxis**. [Practical applications. *Wetter und Leben, Sonderheft*, Vienna, No. 6:196-229, 1959. 21 figs., 30 tables, 2 refs., eq. **DLC**—In this consideration of the practical application of meteorological data of Linz to agriculture and forestry, the authors discuss with the aid of data presented in tables and graphs the following relevant topics: an account of the history of phenological observations in Linz during the 19th century; the phenological year; condition of the soil including annual variation of temperature and moisture conditions; soil temperature variation; thermal isopleths for Linz; frequency distribution of temperature and precipitation; frost dates; rime and dew; sunshine duration; evaporation; thunderstorms and hail; solar radiation; fog; evaluation of precipitation recorders in Linz; intense rain; daily variation of precipitation in Linz; wind during precipitation and downpours; frequency of wind intensity associated with individual wind directions; atmospheric pressure; and number of days per month on which work could not be carried on outdoors during the period 1941-1956. *Subject Headings: 1. Agrometeorological data 2. Linz, Austria.—I.L.D.*

10N-23

551.586:633.11

*Mastinskaia, S. B., **Agrometeorologicheskie usloviia proizvodstva iarovoi pshenitsy na territorii orosheniia Kuibyshevskogo gidrouzla**. [Agrometeorological conditions during the growth of spring wheat in the irrigated territory of the Kuibyshev hydroelectric network.] Moscow, *Tsentral'nyi Institut Prognozov, Trudy*, 29(56):106-127, 1953. 34 tables, 6 refs. **DLC**—In order to determine the agrometeorological conditions associated with the growth of spring wheat in the Kuibyshev regions, extensive meteorological observations were made on air temperature, precipitation, moisture deficit of the atmosphere, soil moisture and on the various growth and development phases of the plant. Extensive statistical data are presented in tables. It is shown that the Kuibyshev hydroelectric network region can be divided into three areas with respect to agroclimatic conditions for the growth of spring wheat. These are as follows: (1) northwest districts of the right bank of the Volga requiring irrigation during dry years; (2) districts requiring irrigation for a greater number of years than the preceding districts; and (3) districts in the Trans Volga region requiring extensive irrigation in order to obtain good yields. *Subject Headings: 1. Climate and crop yield 2. Spring wheat production 3. Agrometeorological data 4. Climate of Kuibyshev 5. Kuibyshev, U.S.S.R.—I.L.D.*

10N-24

551.5:63(05) 551.582.2(497.1)

*Slovenia. Hidrometeorološka Služba, **Dekadno agrometeorološko poročilo**. [Ten-day agrometeorological bulletin.] Vol. 2, Aug. 11-20, 1956, pub. Ljubljana. 4 p. figs. **DWB**—Includes a section on **Weather development in Slovenia** by V. MANOHIN and one on **Crops** by F. VODNIKI. The meteorological section gives a brief synoptic summary and general values of temperature, precipitation and cloudiness for the decade. Four isothermal (mean temperature, deviation from normal, minimum and maximum) and two isohyetal maps are included. *Subject Headings: 1. Agrometeorological data 2. Climate of Slovenia 3. Slovenia, Yugoslavia. I. Manohin, V. II. Vodnik. F.—G.T.*

AGROMETEOROLOGICAL FORECASTING

10N-25

551.509.59:63

Agricultural-Weather Forecasting Meeting, 9th, Boston, Mass., March 28, 1956, **Report**, Boston, W. B. Airport Station, 1956. 5 p. **DWB** (M86:630 A278r)—A list of participants and

rief summaries of papers on agrometeorological forecasting as read at meeting in March 1956 which was attended by agricultural representatives as well as meteorologists and climatologists from the Northeastern states. *Subject Heading: 1. Agrometeorological forecasting.—M.R.*

10N-26

551.509.59:631.1

Andrews, R. T., **Forecasts for farmers.** *Meteorological Magazine*, London, 83(986):226-229, Aug. 1954. 6 refs. DWB—Examples are given of effect of weather on farming. Wet and dry spells are very important and notes are given on form of rain forecasts most useful to farmers. Forecasts of wind, humidity and dew are also useful. *Subject Heading: 1. Agrometeorological forecasting.—C.E.P.B.*

10N-27

551.524.37:551.509.318

*Gifu, Japan. Weather Station, **On the frost damage in the Mino District, Gifu Prefecture.** *Japan. Central Meteorological Observatory, Tokyo, Memoirs of Industrial Meteorology*, 18(2):79-86, March 1955. fig., 4 tables, eqs. In Japanese; English summary p. 86. DLC—Investigations of the meteorological conditions when remarkable frost damage occurred in the Mino district, using 12 examples 1928-1953, show: (1) Distribution of minimum temperature, indicating that cold air often tends to stay in the neighborhood of Minokamo City by radiation cooling and cold air advection from the eastern Mino hills, as the cities Minokamo and Seki and their vicinities form a basin among the central and eastern Mino hills; (2) Tendency of temperature change and duration of low temperature, investigated by using registering thermometers at the Gifu Weather Station; (3) Relation between daily temperature change and frost damage. Frost damage occurs when remarkably cold air attacks the district after a warm period. Investigations were also carried out on the relation between the distribution of minimum temperature and the district where frost damage is usually feared. *Subject Headings: 1. Frost forecasting studies 2. Gifu Prefecture, Japan.—Author's abstract.*

10N-28

551.509.532

Masatsuka, A. and Yonekubo, Y. (*Matsumoto Weather Station*), **On the late frost forecasting in Matsumoto Basin, Nagano Pref.** *Journal of Agricultural Meteorology*, Tokyo, 10(1/2):47-52, Dec. 1954. 4 figs., 5 tables. In Japanese; English summary p. 52. DWB—1) The late frost damage in this area begins usually April 25 and threatens all through May. But it sometimes occurs earlier. Therefore, it is necessary to consider the frost tolerance of crops which varies at each stage of their growth. The writers accordingly accumulated the temperatures over 3°C of the daily mean air temperatures to obtain the so-called accumulative temperature in order to get an index which indicates the growth stage of the crops. As far as this area is concerned, it was found that the perilous period of frost damage begins when the index becomes 150°C. 2) The authors studied statistically the relationship between the existence of frost, and its prediction, based on the data obtained during the years 1907-1950. Using these results, directions are given for calculations by which frost can be forecast. *Subject Headings: 1. Late frost forecasting 2. Nagano Prefecture, Japan.—From authors' abstract.*

10N-29

551.586:633.18

†**Regional forecasting on cool summer damage and drought.** *Journal of Meteorological Research*, Tokyo, 6(4):71-121, May 1954. 29 figs., 17 tables. In Japanese; English summary p. 71.—Numerical values of meteorological elements in the region under consideration are estimated from the observed (or predicted) values at a representative station in Hokkaido and Iwate Prefecture in the case of cool summer damage, and in Hiroshima Prefecture in the case of drought. The conclusions are: 1) In Hokkaido the air temperature in 1945, when cool summer damage occurred, is considered in relation to the main rice growing region (Asahigawa, Sapporo) and its boundary (Obihiro, Abashiri). From the results, we see the applicable range is larger on the plain than in the coastal area. 2) In Iwate Prefecture the air temperature in the years which are normal, somewhat cooler, and in those with temperatures causing summer damage, is investigated for certain regions of Morioka, Miyako and Ishinomaki (or Hachinohe). It seems the middle and southern parts of Iwate Prefecture belong to the Ishinomaki region; its northern part and the east of Iwate mountain range belong to the Miyako region, and the small remaining area to the Morioka region. 3) In Hiroshima Prefecture the applicable range of observed data at Hiroshima station is obtained for the elements of maximum temperature, mean temperature and amount of precipitation taking into consideration the regional division from the point of view of agricultural climatology and growing rate of rice. *Subject Headings: 1. Agrometeorological forecasting 2. Low temperature effects on rice paddies 3. Drought damage to rice paddies 4. Rice paddies 5. Japan.—Author's abstract.*

AGROMETEOROLOGICAL INSTRUMENTATION AND MEASUREMENTS

10N-30

551.501:551.508.29:551.584.4

*Inoue, E.; Imai, K. and Tani, N. (*all, Div. of Met., Nat. Inst. of Agri. Sciences*), **Some measurements of wind over cultivated field, Pt. 7.** *Journal of Agricultural Meteorology*, Tokyo, 14(1):9-14, July 1958. 5 figs., table, 17 refs., eqs. In Japanese; English summary p. 14. **DWB**—In order to study the turbulent fluctuations in both temperature and humidity in the atmospheric surface layer the authors have constructed dry- and wet-bulb copper-constantan thermocouples of fine scales. The diameter of the dry-bulb portion is 0.2 mm and the length is 5 mm, and in order to increase the sensitivity of the wet-bulb thermocouple three couples are connected in series within a narrow space. The sensitivity characteristics of the apparatus have been checked and it has been found that fluctuations of periods of more than 2 sec can be recorded faithfully. The observations of these fluctuations were carried out over a flat bare soil at the height of 1.5 m under fairly calm conditions on a winter night and morning, in which the vertical distributions of mean wind velocity, air temperature and humidity were obtained simultaneously. These results are, however, not confirmed, since the sensitivity of the instrument is not sufficiently good. (For Pt. 1, see 5.2-164; Pt. 2, see 7.6-160; Pt. 3, see 8.3-234; Pt. 4, see 9.10-211, *Met. Abs.*) **Subject Headings:** 1. Vertical wind velocity distribution measurements 2. Vertical temperature distribution measurements 3. Vertical humidity distribution measurements.—*From authors' summary.*

10N-31

551.501.9:63 551.508:63

Kreutz, Wilhelm, **Instrumentelle und gerätemässige Grundausrüstung der agrarmeteorologischen Dienststellen.** [Basic instruments and equipment of agrometeorological offices.] *German. Deutscher Wetterdienst, Mitteilungen*, 2(14):178-181, 1955. **DWB**—The author describes the layout and installation of agrometeorological observation stations and a list of the instruments and other equipment required for observation of the various meteorological variables. **Subject Headings:** 1. Agrometeorological stations 2. Agrometeorological instruments.—*I.L.D.*

10N-32

551.501.546.264 551.508:63

Uhlř, Pavel and Kešner, Bohuslav, **Stanovení kysličníku uhlíčitého v ovzduší.** [Determination of atmospheric carbon dioxide.] *Československá Akademie Zemědělských Věd, Prague, Sborník Ser. A*, 26(4):293-302, 1953. 5 figs., table. Russian and German summaries p. 302. **DLC**—A titration-technique apparatus for atmospheric carbon dioxide measurement is described in detail and illustrated, with thorough operating instructions. The portable instrument is suitable for agrometeorological measurement and was designed particularly with application to cattle raising in mind. Sample data are included. **Subject Headings:** 1. Carbon dioxide measurement instruments 2. Agrometeorological instruments.—*G.T.*

AGROMETEOROLOGICAL RESEARCH STATIONS

10N-33

551.501.9:63(477)

Kirilenko, P. and Protopopova, O., **70-letneiǐ iubilėi Poltavskoǐ meteorologicheskoi stantsii.** [Seventieth anniversary of the Poltava Meteorological Station.] *Meteorologiya i Gidrologiya*, Leningrad, No. 2:60, Feb. 1956. **DWB, DLC**—Nov. 1955 marked the seventieth anniversary of the Poltava which was established in connection with one of the first agricultural experimental stations to be established in Russia. At present this station carries on extensive work on climate and soil management, the physical properties of soils, critical temperature of winter wheat, etc. **Subject Headings:** 1. Poltava Meteorological Station 2. Agrometeorological research stations 3. Poltava, Ukrainian S.S.R.—*I.L.D.*

10N-34

551.5:63(04)

Visit to East Malling Research Station. *Meteorological Magazine*, London, 80(951):271-273, Sept. 1951.—A brief account of some of the work of this agricultural meteorological research station. **Subject Headings:** 1. Agrometeorological research stations 2. East Malling Research Station, Eng.—*C.E.P.B.*

LOCAL CLIMATOLOGICAL DATA, MICROCLIMATES

LOCAL CLIMATES

10N-35

551.582.2:581.5(676.1)

Berger, Herfried (*Vienna*), **Klimatische und pflanzengeographische Beobachtungen in Ostuganda.** [Climatic and plant-geographic observations in east Uganda.] *Wetter und Leben*, Vienna,

0(8/10):132-136, 1958. 7 refs. **DLC**—The author summarizes some botanical-climatic observations which he made during a three month trip (June-August 1957) in the East African Plateau, in the border region of Kenya, Uganda and the Sudan. The dominating structural element in the relatively dry, equatorial plateau of east Uganda is a double volcano series extending in a meridional direction. The eastern volcano series marks the boundary of Uganda and Kenya through Mount Elgon (4323 m), Mount Kadam (3064 m) and Mount Mosoto (3084 m). Mount Elgon with its large "cauldron" constitutes a climatic transition region; on the Kenya side there is one principal rainy (April-Sept.) season with storms; the Uganda side is marked by two distinct rainy seasons (April-June, Sept.-Dec.) and also the intervening months are not completely lacking in rain. The westward face of the Elgon is the more arid side; the eastward side towards the Indian Ocean is the more humid one. The high altitude forest at 1900-2000 m elevation has an annual average of 1440 mm of rainfall and 148 rain days. The maximum rainfall is at 3100-3300 m amounting to 1800-2000 mm/yr. Above this elevation there is a decrease in rainfall and atmospheric humidity. Cloud formations resemble those of Mount Kilimanjaro and Mount Kenya. The volcanic mountains of eastern Uganda are enveloped in cloud, haze and fog even during the dry season. At 3700 m elevation an insolation temperature of 45°C was measured between 10 a.m. and 2 p.m.; the air temperature was 10°C. Daily temperature variation may be as much as 40°C. Frost temperatures are frequent on Mt. Elgon. In the adjoining volcanic region of Karamodja there was a cactus savanna with numerous succulents. The daily maximum temperature was 33°C (July) and the minimum, 18.7°C. Westward a humid savanna begins. At Moroto, the eastern foot of this mountain (1280 m), the annual rainfall was 870 mm; at 2620 m it was 1200 mm. Only the peak of Mount Elgon is subject to thunderstorms, hail and snow, which forms a snow cover at 4000 m. *Subject Headings:* 1. Climatic data 2. Climate of East Uganda 3. Plant ecology 4. Uganda, Africa.—*I.L.D.*

10N-36

551.582.2(453.33)

Briški, Andrej, *Agrarna geografija Šavriškega gričevja*. [Agricultural geography of north-western part of Istria.] *Geografski Zbornik*, Ljubljana, No. 4:221-274, 1956. figs., map (fold.), 11 refs. English summary p. 271-272. **DWB**—This description of the agricultural geography of Slovene Istria (which was part of Zone B of the free territory of Trieste before 1954), includes a chapter on the climate of this region. Monthly averages of temperature (6 stations), rainfall (3 stations, summer season), and number of days with fog are tabulated for periods of varying length (starting with 1901). The stations are all peripheral; no direct records are available for the central part of the region. *Subject Headings:* 1. Climate of Istria 2. Istria, Trieste.—*G.T.*

10N-37

551.585.9:551.584.43:551.524

Brooks, Frederick A. (*Calif. Univ. Agr. Exp. Sta., Davis, Calif.*) and Kimball, M. H. (*Agr. Ext. Dept., Calif. Univ., Los Angeles*), *The use of day and night temperatures as a plant-climate indicator*. [1958.] 3 p. + 4 figs., table, refs. Presented at the 2nd National Conference on Agricultural Meteorology, 170th National Meeting of the American Meteorological Society, Oct. 22-24, 1948, New Haven, Conn.—A new method of plant-climate zone classification planning suggested by M. H. KIMBALL and taken up by WENTZ is presented and discussed. It is based on the use of the mean monthly maximum, minus one-fourth of the diurnal range, as effective day temperature, and the mean monthly minimum, plus one-fourth of the range, as the effective night temperature. Plant climate is thus considered in a 4-dimensional relationship described by WENTZ as follows: 1) photoperiod, 2) effective day temperature, 3) effective night temperature, 4) stage of growth. A table of effective day/night temperatures at 50 agricultural experiment stations in California is annexed. *Subject Headings:* 1. Plant-climate zone classification 2. Effective day/night temperatures.—*A.M.P.*

10N-38

551.582(682)

†Cole, Monica M. (*Univ. College of North Staffordshire, Eng.*), *Land use studies in the Transvaal Lowveld*. London, Geographical Publications, 1957. 41 p. 36 figs., 2 tables, 51 refs. (*World Land Use Survey, Occasional Papers*, No. 1.) **DLC** (GB365.T7C6). Review in *Scottish Geographical Magazine*, Edinburgh, 73(3):188, Dec. 1957.—The climate of the Transvaal Lowveld (eastern Transvaal and Swaziland) is treated in general on p. 16-20, of this soil, agriculture and land use study, but with detailed tabular data for 10 stations in the area ranging from 460-5000 ft above sea level, and an elaborate graphical analysis of temp. for 4 selected stations (max., min. and range of temp.). Many maps of the region are included, besides photographs and an isohyetal chart of the Crocodile-Komati Valley and Litura Valley. *Subject Headings:* 1. Climate of Transvaal Lowveld 2. Transvaal, S. Africa.—*M.R.*

10N-39

551.585:63(827)

*De Fina, Armando L. and Garbosky, Antonio J., *Difusión geográfica de cultivos índices en la provincia de La Pampa y sus causas*. [Geographic distribution of index crops in La Pampa Province

and its causes.] *Argentina. Instituto de Suelos y Agroecología, Publicación*, No. 58, 1958. 71 p. tables, 19 maps (colored). **DWB** (M(055) A691p)—A general treatment of the agroclimatic and ecological conditions of La Pampa Province accompanied by numerous charts. The distribution of various perennial (12) and annual (16) crops is discussed and shown on charts. Ch. IV takes up the 11 agroclimatic regions of the Province, as defined by the system of DE FINA. Chart 19 shows these 11 districts. This subdivision is based on the mean temp. of the warmest month (Jan.) and the coldest month (July), precipitation during the warm and cold seasons, etc. *Subject Headings*: 1. Climatic classifications 2. Agroclimatic regions 3. La Pampa Province, Argentina.—M.R.

10N-40

551.582:63(477)

*Fedorov, Evgraf Evgrafovich, *Klimat Evropejskoj Rossii v sel'skokhoziajstvennom otnoshenii* [Climate of European Russia in relation to agriculture.] Leningrad, Izdat. Mysl', 1924. 28 p. map (fold.), 15 tables. **DLC**—This monograph contains notes on synoptic forecasting climatology and the climate of European Russia as applied to agriculture. The various tables and charts are presented in the following order (mean monthly values for 25-50 stations except where noted): arranged by geographical regions: 1) mean temperature and seasonal variability; 2) ten-day mean temperatures for March-Oct.; 3) highest and lowest mean monthly temperatures (1870-1915); 4) extreme temperature each month (1876-1915); 5) frequency and time of first and last frost; 6) mean relative humidity for 24 hrs and for 13 hrs (March-Oct.); 7) mean precipitation (1888-1912); 8) greatest and least monthly precipitation; 9) number of days with precipitation; 10) evaporation; 11) sunshine duration and number of sunless days; 12) wind direction and speed frequency; 13) number of days with snow cover and first and last snow cover; 14) mean snow cover depth by decades; 15) number of days with thunder and hail. *Subject Headings*: 1. Climate of European U.S.S.R. 2. Agricultural climatology 3. Snow cover data 4. U.S.S.R.—M.R.

10N-41

551.582.2(786) 551.58:633

Gieseke, L. F., *Soils of Richland County: soil reconnaissance of Montana, preliminary report*. Montana. Agricultural Experiment Station, Bozeman, Bulletin, No. 515, Nov. 1956. 3 tables, 38 maps (fold.) in pocket. **DWB**—Temperature and precipitation data for Culbertson, Savage and Vida, in Richland County (extreme ENE part of Montana) are presented in tables for each month, season and year, and discussed, along with wind conditions, on p. 18-22 of this standard survey of soils, vegetation, agriculture and physiography of the county. *Subject Headings*: 1. Climate of Richland County, Mont. 2. Agricultural climatology 3. Richland County, Mont.—M.R.

10N-42

551.582.1(497.1)

Kokole, Vladimir, *Gospodarska geografija in geografija naselij v področju med Savo in Sotlo*. [Economic geography and the geography of settlements between the Sava and the Sotla Rivers.] *Geografski Zbornik*, Ljubljana, 4:5-128, 1956. 5 figs., tables, refs. French summary p. 120-127. **DWB**—This detailed treatment of the agricultural and economic geography of a part of Slovenia includes a section on the climate of the region (p. 14-17). Mean and extreme value and seasonal variations of temperature and precipitation are presented and discussed according to records available for two stations for the period 1925-1940. *Subject Headings*: 1. Climate of Yugoslavia 2. Yugoslavia.—G.T.

10N-43

551.506.3:551.582.2(436) 551.586:633.1

*Mayr, Erwin, *Witterungsverlauf 1943-1952 und sein Einfluss auf die Vegetationszeiten des Getreides*. [Weather of 1943-1952 and its effect on the vegetative period of grains.] Innsbruck. Universität. Institut für Meteorologie und Geophysik, Publikation, No. 54, [1956?]. Reprint, p. 36-75 from unidentified source. numerous tables. **DWB** (Reprint file)—A year-by-year (1943-1952) summary of the local climatological conditions, showing mean values of air temperatures at 10 cm. and 50 cm above the ground. Subsoil temperatures are given for 0.02 m, 0.05 m, and 0.1 m depths for each month of the period 1943-1952. The recordings include first and last day of frost, duration (in days) of ground frost and snow cover, sunshine hours, precipitation, humidity for each month of the year and also the 10-yr values of humidity by month. Extremes are given. Finally, values are shown for each year for several kinds of grains during the vegetative period which is divided into seeding, sprouting and harvesting. *Subject Headings*: 1. Climatic data 2. Agricultural bioclimatology 3. Grain crops 4. Innsbruck, Austria.—W.N.

10N-44

551.582.1(82)

Mikenberg, Natalio, *Reconocimiento agrohidrológico del valle medio del Rio Negro entre Gral. Conesa y 2da Angostura*. Zona Económica no. 63, Punto 8 del Plan de Gobierno. [Agrohydrological exploration of the middle valley of the Rio Negro between General Conesa and Segunda Angostura. Economic zone no. 63, Point 8 of the Government's plan.] *Argentina. Instituto de Suelos y Agroecología, Publicación*, No. 30, 1954. 36 p. 19 photos, table, diagr. (fold.), 13 refs.

DWB—In addition to an account of the physiography, vegetation, soils and water regime, this study contains a description of the climate. Mean monthly values of the various meteorological variables, effective and equivalent temperatures, index of aridity, etc. are given. *Subject Headings: 1. Climate of the Rio Negro Valley 2. Argentina.—I.L.D.*

10N-45

551.524.37(81) 551.577.38(81)

*Mota, Fernando Silveira da (*Dir. Sec. of Climatology, Instituto Agronomico do Sul, Pelotas*), *Secas e sêcas no município de Pelotas*. [Frosts and droughts in Pelotas Municipality.] *Agros*, Pelotas, 5(3):185-193, Sept. 1952. fig., 2 tables, 8 refs.—Number of days each month and season, 1940-1951 with minimum temperature $<0^{\circ}\text{C}$, and number of years with subnormal precipitation (drought) 1893-1948 at Pelotas are analyzed and data and frequencies presented in tables and discussed. *Subject Headings: 1. Frost frequency data 2. Drought frequency data 3. Pelotas, Rio Grande do Sul, Brazil.—M.R.*

10N-46

551.582.2:63(481)

*Norway. Statens Kornforretning, *Klimatabeller for landbruket*. [Climatic tables for agriculture.] Oslo, 1955. 139 p. almost entirely tables. Laid in: Table of contents in typescript. DWB (M:630N982K)—For each station tables of normals for the various meteorological variables, e.g., monthly means, are presented and also heat sums for various dates and dates of frost occurrence, etc. Also included are tables giving monthly mean temperature, precipitation and relative humidity for stations with incomplete records; frost probability, dates of disappearance of frost in spring, amount and frequency of precipitation, 5 day mean of air temperature, etc. *Subject Headings: 1. Agricultural climatology 2. Monthly mean climatic data 3. Frost probability 4. Norway.—I.L.D.*

10N-47

551.584:551.45 551.579.5

Olson, R. V. (*Kansas State College, Manhattan*), *The Great Plains Area. Advances in Agronomy*, N. Y., Vol. 10, 1958. P. 3-8. fig., table. Also: Hide, J. C. (*Montana State College, Bozeman*), *Soil moisture conservation*, *Ibid.*, p. 23-36. 5 figs. DWB (630.72 A244ad)—In this collection of articles on agronomic trends and problems in the Great Plains there are two articles which deal extensively with the climate and its effects on soil moisture. The first or introductory article by R. V. OLSON describes the Great Plains and its climate, with a temperature-precipitation chart based on 1899-1938 and 1921-1950 data, respectively. Variability from year to year is emphasized. The article by J. C. HIDE on soil moisture goes into efficiency of summer fallow, rainfall patterns, stored moisture and crop yields, transpiration, runoff, erosion, effect of size of rainfall on water loss or storage effect of trash cover, dew, snow, fertilizer, irrigation, etc. *Subject Headings: 1. Climate of Great Plains 2. Soil moisture 3. Great Plains.—M.R.*

10N-48

551.506.3(46) 551.582.2(46):63

*Spain. Servicio Meteorológico Nacional, *Calendario meteoro-fenológico, 1957*. [Meteorological-phenological calendar, 1957.] Madrid, 1957. Approx. 150 p. tables, figs., charts (some fold.). Latest issue seen: 1960, pub. 1959. DWB—Besides the usual astronomical and almanac data, this little volume presents extensive climatic and phenological data for Spain and particularly for Madrid for 1955-56, and for normals, in some cases as long as 1859-date (rainfall for agricultural year). Much of the information is in graphic form, but articles on such subjects as the Azores Anticyclone by I.F.P. (p. 121-30), on the history of meteorology in Spain (by J.M.-L.), on thunderstorms in Spain 1955/6 (14,858) by E.O.F., and of deaths by lightning in 1955 (133), average 1941-56 equals 67 (by J.M.-L.). *Subject Headings: 1. Climatic data, Spain 2. Thunderstorm data, Spain 3. Lightning death statistics 4. Spain.—M.R.*

10N-49

551.582(234.85) 551.585:63

*Ural (Province). Oblastnaia Planovaia Komissiia, *Sel'skokhoziaistvennye raiony Ural'skoi oblasti*. [Agricultural regions of the Ural Area.] Ed. by N. E. Ishmaev and others. Sverdlovsk, Izdatiie Uralplana, 1928. 192 + 72 p. numerous foot-refs. and tables, figs. (incl. maps, some colored and fold.). DLC—After an introduction describing methods used in "agricultural regionalization," the details of the temperature and precipitation regime in the Ural region centered around Sverdlovsk, are given in a chapter on climatic regionalization (p. 5-26) with text, tables and numerous isarithm charts. Monthly and seasonal relative humidity and pressure for 22 stations are also presented. A discussion of the climatic regions of the territory analyzes the peculiarities of temperature, humidity, rain and snow for each of 13 individual sections. Length of growing season is emphasized. Other agricultural economic factors are considered in later chapters. *Subject Headings: 1. Climate of Ural Area 2. Agroclimatic regions 3. Regional climates 4. Ural Area, Asiatic U.S.S.R. 5. Ishmaev, N. E. (ed.).—M.R.*

10N-50

Yoshino, Masatoshi (*Tokyo Education Univ.*) and Fusuki, K. (*Risshō Univ.*), **An estimation of the local climate from the number of the mulberry leaf development in Okuchichibu mountain region, Japan.** *Journal of Agricultural Meteorology*, Tokyo, 12(2):53-56, Oct. 1956. 2 figs., 3 tables, 7 refs. eq. In Japanese; English summary p. 56. **DWB**—Observations of the number of the mulberry (*Morus alba* L. var.) leaves on May 7, 1955 were made in Okuchichibu Mountain region, at a point where the valley runs almost east or east-southeast. The distribution of the number of leaves on the slopes facing south in the observed area is shown. Using the relation obtained in another paper the March mean monthly air temperature was estimated from the number of leaves. Result of the comparison of the difference between the estimated values and the observed values at two weather stations was $\pm 0.2^{\circ}\text{C}$. In conclusion, the local climatic differences in this area were as follows: 1) as an average state in March, the slopes facing south were warmer by about 1°C than those facing north; 2) compared with this marked evidence, there was no clear tendency along the river course; 3) differences from place to place along the river course were $1.0-1.2^{\circ}\text{C}$. This is considered as the cross-section shape of the valley. 4) The greatest difference caused by the different shape of the cross-section was shown on the slopes facing north, secondly in the valley bottoms, and then on the slopes facing south. **Subject Headings:** 1. Local climatology 2. Phenological observations 3. Mulberry trees 4. Japan.—*Authors' abstract.*

551.506.8(52)

AGRICULTURAL CLIMATOLOGY

10N-51

Birch, W. R., **High altitude ley agronomy in Kenya, Pt. 1, Observations on the climate and soils.** *East African Agricultural Journal*, Kenya, 25(1):35-41, July 1959. 5 figs., 2 tables, 14 refs. **DLC**—The present article deals with some of the wider aspects of the high altitude climate and soils of Kenya. Data are given for several stations concerning precipitation, temperature, sunshine and soil temperatures. For 5-6 months out of a growing season of 8 months, when rainfall is not a limiting factor for pasture growth, the mean monthly temperatures at high altitudes (over 8000 ft) are considerably lower than those of the temperate and winter rainfall climates of higher latitudes. Kenya high altitude temperatures are similar to those of the spring and autumn of pasture countries such as New Zealand, England and South Australia. The implications of the short days, the comparatively low soil temperatures, and the low pH of high altitude soils are discussed in relation to the need for ley grasses and legumes for the high altitude areas of Kenya which total about 700,000 acres. **Subject Headings:** 1. Agronomy 2. High altitude climates 3. Climatic data 4. Kenya.—*Author's abstract.*

551.582.2:551.585.7:63(676)

10N-52

Carter, Horace S. (*U. S. W. B., Athens, Ga.*), **Weather and poultry in Georgia.** *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 46(34):7-8, Aug. 24, 1959. fig., 3 refs. **DWB**—Georgia has led the nation in commercial broiler production every yr since 1951. In 1957 the income from these broilers was 42.4% of the state's total cash income from livestock. It is a recognized fact in Georgia that prolonged hot weather causes lowered feed efficiency and reduces the rate of growth of the broilers. Weather is an important factor in successful broiler production. The University of Georgia operates a research center where research on poultry diseases and climate is carried on. The Poultry Disease Research Center was completed in 1957. **Subject Headings:** 1. Agricultural bioclimatology 2. Poultry husbandry 3. Georgia.—*N.N.*

551.586:636.5(758)

10N-53

Chaptal, L., (*Dir. Station of Physics and Agri. Climatology of Montpellier*), **Sur un mode de représentation des conditions atmosphériques en écologie agricole.** [Representation of atmospheric conditions in agricultural ecology.] *Paris. Institut National de la Recherche Agronomique, Annales Agronomiques*, New Ser., p. 359-365, (after 1932). 2 figs., 4 refs. Photostat of separated pages. **DWB** (634.947 C467su)—A method is described for constructing climograms representing eight climatic elements. The climograms serve the purpose of comparing climatic conditions either at different places or at the same place at different times. **Subject Headings:** 1. Climograms 2. Climatic comparisons.—*G.T.*

551.586:63

10N-54

*Daigo, Y. (*Japan Met. Agency, Tokyo*), **Study on the agrocimate of Japan.** *Geophysical Magazine*, Tokyo, 28(2):149-236, Dec. 1957. 42 figs., 18 tables. **DWB, DLC**—Since 1938, the author has been working to establish facts on the agrometeorology of Japan. The two most important study areas are relation of agriculture to climate, and the method of estimating climate in locations where no meteorological observations have been made. Results of the study since 1946 are reported. The report covers the following problems: 1) The crop cultivation limit and the

551.586:63 551.582:551.585(52):63

habitability of cultivation in relation to the climate; 2) Relation of crop cultivation time to climate; 3) Relation of farm land utilization rate to climate; 4) Climatic classification of provinces based on the productivity of the farm land; 5) Agroclimatic classification of provinces, based on climatic damage to crops; 6) Selection of a climatically analogous zone as a standard of improved agricultural practices. *Subject Headings:* 1. Agroclimatic data 2. Climate of Japan 3. Climatic classification 4. Rice culture 5. Japan.—*M.F.H.*

10N-55

551.58:63(02)(47)

†Kontorshchikov, A. S., *Agroklimaticheskie spravochniki i ezhegodniki v SSSR*. [Agroclimatological handbooks and yearbooks in the U.S.S.R.] (In: U.S.S.R. Glavnoe Upravlenie gidrometeorologicheskoi Sluzhby, *Voprosy agrometeorologii*, ed. by F. F. Davitaia and M. S. Kulik. Moscow, 1958. p. 88-91. 34 refs.)—The first World Agricultural Handbook to appear anywhere in the world was published in 1937 in the U.S.S.R. under the editorship of G. G. SALIANINOV. The first oblast agroclimatic handbooks were compiled in 1954. At present agroclimatic handbooks are compiled according to a special handbook. By July 1958 there were already published 15 agroclimatic handbooks and 37 were ready for publication. These handbooks serve the following purposes: to set up systems of technical agricultural procedures in the light of prevailing agroclimatic characteristics; to provide comparative evaluation of agrometeorological conditions for the growth of plants during a given year according to mean long period conditions; to encourage rational distribution of crops over an area, etc. The agroclimatic data are presented in the form of numerical tables with explanatory text. The handbooks contain the agroclimatic characteristics of an oblast and its classification according to heat supply and amount of moisture. A special section contains information on climatic resources. The section "Agroclimatic Characteristics of the Condition of Growth of Farm Crops" contains data on the agroclimatic characteristics of the growth and development of plants; it includes phenological data on developmental phases of crops; data on moisture supplies in the soil of the fields, etc. The section "Agroclimatic Information for Animal Industry" contains data on the conditions for cattle pasturing, duration of the stabling period; conditions for hay harvesting, etc. The agroclimatic handbooks are based upon the observations provided by hydrometeorological service; these observations have been published since 1945 in yearbooks. *Subject Headings:* 1. Agroclimatological handbooks 2. U.S.S.R.—*I.L.D.*

10N-56

551.586:581.9(911)

Kostermans, A. J. G. H. (*Botanical Div., Forest Res. Inst., Bogor, Indonesia*), *Note on lowland vegetation in equatorial Borneo*. (In: UNESCO, *Study of tropical vegetation: proceedings of the Kandy Symposium, Kandy, Ceylon, March 1956*. Paris, 1958. p. 154-158. French summary p. 57.) DWB (M86:580 U581st)—The initial stage of mangrove stands in north and northeastern Borneo does not seem to be the same as in the other parts of Indonesia. Nipa vegetation covers hundreds of square km near and in the estuaries of the big rivers. In South Borneo, where the conditions are equally favorable for mangrove, no such Nipa "fields" are found. In habitable places along the big rivers, practically all original vegetation has been destroyed by man. The author draws attention to the almost pure stands of *Gluta reinghas* (average height 30 m) bordering the lakes in places. Peat swamp forests are characteristic of large areas of Sumatra and Borneo. The dry-land forests may be divided into two edaphic climaxes. The sandy regions of Borneo have a distinct vegetation. Secondary vegetation, attributable to man is widespread, differing in composition and a physiognomy. *Subject Headings:* 1. Tropical vegetation 2. Tropical bioclimatology 3. Borneo.—*Transl. of author's abstract.*

10N-57

551.58:63(439.1)

Kulin, István, *Az agrárklimatológia néhány kérdése*. [Some problems in agricultural climatology.] *Időjárás*, Budapest, 59(5):257-267, Sept./Oct. 1955. 4 figs. Russian and English summaries p. 257. DLC—Various details of climatological and microclimatic research for agricultural purposes are discussed. A method of graphic presentation is described, whereby positive and negative departures of climatic elements are illustrated by means of columns appearing above and below a straight line representing the long period average. This type of diagram is considered convenient for a quick visual appraisal of various climatic characteristics of interest to agriculture, such as the frequency and persistence of near average or extreme values. As an example the author presents monthly, seasonal, semiannual and annual precipitation and temperature departures for Szeged for the period 1871-1955. *Subject Headings:* 1. Agricultural climatology 2. Graphic presentation 3. Temperature variations 4. Agricultural microclimatology 5. Szeged, Hungary.—*J.T.*

10N-58

551.586:63(52)

Mariyama, Eizō (*Japan Met. Agency, Indust. Met. Sec.*), *Agriculture and weather. Meteorological Research Notes (Kishō Kenkyū Note)*, Tokyo, Japan, 9(2):69-80, June 1958. 5 figs., 3 tables,

2 refs., 11 eqs. In Japanese. DWB—Studies on the relation between weather and crops, water content of plants, evapotranspiration at surface, major agricultural damage by weather in Japan, and agricultural weather forecast are reviewed. *Subject Headings*: 1. Agricultural climatology 2. Japan.—J. H. Woo.

10N-59

551.586:634(7)

†Olmstead, Clarence W. (*Univ. of Wisconsin*), **American orchard and vineyard regions.** *Ecological Geography*, Worcester, Mass., 32(3):189–236, July 1956. 9 figs., table, 40 refs. DWB, DLC—The climatic factors affecting the poleward limits of specific nut or fruit trees, or vines are discussed on p. 206–208, equatorward limits on p. 208–209, spring frost hazard on p. 209–210, spread of orchards in the west on p. 210–212, climate and disease or pests on p. 212 and plant breeding on p. 212–22. Specific varieties of fruits are considered in this treatment. It is noted that factors which are critical in western Europe are not vital in Eastern U. S. and vice versa. In Europe, lack of summer heat and in Eastern U. S. the severe winters are of prime concern. Cherries, apples, pears and plums require low summer temperature and winter cold, but not too severe. *Subject Headings*: 1. Orchard climatology 2. Vineyard climatology 3. United States.—M.R.

10N-60

551.5

Sobolev, L. N., **Opyt kompleksnoi kharakteristiki ugodii na osnove territorial'nykh ekologicheskikh skhem.** [Attempt at a complex description of agricultural land on the basis of a territorial ecological scheme.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 6:36–42, Nov./Dec. 1959. 2 tables. DLC—A method for classifying a climatically homogeneous and geographically uniform area on the basis of the ecology of its vegetation is described. It is based primarily upon the humidity of the ecotype and secondarily on that of the soil. The territorial ecological scheme is based upon the humidity characteristics of atmosphere, soil atmosphere, soil and of open water bodies associated with particular substrates. The work chart for applying the method and its application to a specific area to the steppe piedmont of the eastern Terskei Ala Tau range is given. *Subject Headings*: 1. Climatic classifications 2. Ecoclimatology 3. Terskei Ala Tau range, Asiatic U.S.S.R.—I.L.

10N-61

551.584

Tumanov, I. I., **Stantsia iskustvennogo klimata.** [Station of artificial climate.] *Akademiia Nauk SSSR, Vestnik*, 27(10):111–116, Oct. 1957. Transl. A-891 (source unidentified) of 9 p., typescript, available for reference. DWB (M84.43 T925st)—A station in the Soviet Union has been set up for scientific research in plant physiology and the reaction of plants to the most important external factors: light, temperature, water, and food regimes under refrigerated and dry wind conditions. Such laboratories have also been introduced recently in U. S., Belgium, Holland, and France. *Subject Headings*: 1. Artificial climates 2. Agroclimatological research 3. U.S.S.R.—N.L.

10N-62

551.5:63:632.111.5(5)

Ulanova, E. S., **Agroklimaticheskie usloviia osennego perioda razvitiia i rosta ozimyykh kul'tur Zapadnoi Sibiri.** [Agroclimatic conditions during the autumnal development and growth of winter crops in Western Siberia.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy*, 47(74):3–41, 1955. 26 figs., 27 tables, 2 refs. DLC—Results of a very detailed study of the problem during the months of Aug. and Sept. 1940–1952 in Tomsk, Omsk, Novosibirsk Regions, and Altai Krai are presented in numerous tables and graphs, and commented upon. It is shown that 1) In the northern forest regions of Western Siberia, sufficient soil moisture and normal development of winter crops occur 70–80% of the investigated years. In 20–30% of the years, the crops suffer from lack of warmth and remain undeveloped; 2) In the forest-steppe regions, favorable conditions of warmth and moisture occur in 40% of the years. 3) In the steppe regions 50–60% of the years are favorable in regard to warmth but unfavorable in regard to soil moisture, and winter crops do not develop fully. Only 5–15% of years are fully favorable. Agrotechnical measures for the preservation of moisture in the soil are of great importance in the steppe belt. *Subject Headings*: 1. Agroclimatological data 2. Winter crops 3. Western Siberia, U.S.S.R.—A.M.P.

DRY AND ARID CLIMATES

10N-63

551.555.3:551.556.2:634.9(47)

Buchinskii, I. E., **K voprosu raspolozheniia polezashchitnykh lesnykh polos na Ukraine.** [Distribution problem of field-protecting forest belts in the Ukraine.] *Kiev, Ukraine. Nauchno-Issledovatel'skii Gidrometeorologicheskii Institut, Trudy*, No. 8:46–69, 1957. 11 figs., 15 tables, 4 refs. DLC—in order to find the best disposition of field-protecting forest belts in the Ukraine territory, detailed analysis of the recurrence of dry wind directions for 1935–1955 was cited, and wind roses of prevailing dry winds were plotted on maps for individual months of the warm season, and for the

periods April-July and April-Oct. As a result of this work the author presents a map divided into districts in which the most advantageous directions of future forest belts are plotted. It is added that in flatlands and on slopes, whose steepness exceeds 2%, the forest belts should be distributed, not with the consideration of dry winds' direction, but of the winter winds' direction in the first case, and across the slope in the second. A table showing the frequency of dry winds according to bearings (in %) for 15 representative localities, is appended. *Subject Headings: 1. Dry wind areas 2. Forest shelter belt planning 3. Ukrainian S.S.R.—A.M.P.*

10N-64

551.577:631.58(73)

Duley, F. L. (*Soil and Water Conservation Research Branch, Dept. of Agriculture*) and Coyle, J. J. (*U. S. Soil Conservation Service*), **Farming where rainfall is 8-20 inches a year.** U. S. Dept. of Agriculture, *Water: the Yearbook of Agriculture*, 1955:407-415, pub. 1955. DA, DWB—Dry farming is more successful in the Northwest where temperatures are lower and where moisture comes in winter when evaporation is less and hence penetrates the subsoil more easily than in the south where evaporation is much greater even with the same rainfall. Problems of erosion, grazing, soil conservation, fertilizers, tillage, crop protection, and types of grass are discussed. Map shows areas of light, moderate or severe soil erosion in United States. *Subject Headings: 1. Dry farming 2. Effective rainfall 3. Soil erosion 4. Northwestern United States.—M.R.*

10N-65

551.577.38(41/2):631.6

Hayles, W. A., **It may be a dry summer!** *Farmer and Stockbreeder*, 69:55-57, 29-30 March, 1955. 5 figs.—With modern methods of cultivation, the limiting factor in dry parts of SE England is the rainfall. A map shows the number of years out of 10 in which rainfall is below plant growth needs. Methods of artificial watering are illustrated. *Subject Headings: 1. Drought areas 2. England.—C.E.P.B.*

10N-66

551.311:551.585.55(47) 551.586:631.44:63

*Ivanov, A. E.; Matiuk, I. S. and Mironov, V. V., **Peski i ikh osvoenie.** [Sandy tracts and their reclamation.] Moscow, Gosud. Izdatvo Sel'skokhoziaistvennoi Lit., 1955. 254 p. 54 figs., 25 tables. DLC (S615.M6)—Basic problems of converting the sandy tracts of the southern and south-eastern semiarid regions of European U.S.S.R. into woody, pasture and lightly arable land suitable for the cultivation of fodder crops. Viticulture and melon and fruit growing are taken up by scientific workers of the All Union Land and Forest Reclamation Institute. The individual chapters deal with: 1) Basic principles of sandy soil conservation; 2) Forestation on sands and soils; 3) Agricultural utilization of sandy and sandy-loam soils. A section (p. 28-42) deals with moisture content of sandy soils, with field data presented in tables and graphs. *Subject Headings: 1. Semiarid regions 2. Desert reclamation 3. Arid zone agriculture 4. U.S.S.R. I. Moscow. Nauchno-Issledovatel'skii Institut Agro-Lesomeliioratsii.—A.M.P.*

10N-67

551.585.53:551.579:631.67(569.4)

†Shanan, L.; Tadmor, N. and Evenari, M., **The ancient desert agriculture of the Negev: utilization of runoff from small watersheds in the Abde (Ovdar) region.** Rehovot, Israel. *Agricultural Research Station, Ktavim. Records*, 9(1/2):107-128, Dec. 1958. 20 figs., 31 refs. DLC, NN—The utilization of storm water runoff by ancient civilizations in small watersheds of the Abde region was investigated. Small terraced fields and farm units in the valleys received their irrigation water principally by means of stone conduits that collected the runoff from slopes and plateaus. These conduits subdivided the overall watershed into small catchments, each serving a definite area. Increased runoff was achieved by clearing the stones off the surface of the catchment area. Surplus stones, which were not used in the construction of the conduits, were placed in mounds. The stone-built mounds of the Abde region are compared to the gravel heaps of Sbeita (Shivta). Their basic functions are identical and the differences stem from petrographic and topographic factors. *Subject Headings: 1. Desert agriculture 2. Runoff utilization 3. Negev Desert, Israel.—Authors' abstract.*

MICROCLIMATOLOGY

10N-68

551.579.5:551.571:581.1.055

†Barry, J. P., **Les plantes et l'eau atmosphérique.** [Plants and atmospheric water.] *L'Année Biologique*, Paris, 35(3/4):115-125, March/April 1959. 54 refs. DLC, DA, DNLM—An examination is presented of the water exchange between plants and atmospheric and pedological media. The author investigates the role of water vapor in the atmosphere and studies condensations (dew); the chemical composition of dew, which varies according to the regions and altitude; the favorable effect of vegetation on such condensations. The process of absorption of atmospheric water by the plants is briefly described. An important bibliography terminates this synthesis of current ideas

concerning the microclimate of plants. *Subject Headings:* 1. Plant microclimatology 2. Water vapor transport 3. Dew.—A.V.

10N-69

551.58:63:551.584.4

Cheng, Kenneth T. C., *Recent tendency on agroclimatological researches.* *Meteorologische Bulletin*, Taipei, Formosa, 4(4):1-5, Dec. 1958. 31 refs. In Chinese; English summary p. 1. **DWB, DLC**—Recent studies show that agroclimatology and bioclimatology have made tremendous progress during the last decade. In particular, the development of micrometeorological instruments for the observation of air layers near the ground has been noteworthy. The writer in his paper outlines the important contributions selected from voluminous publications in different countries. 1) It would possibly give a few hints to those students who are wishing to carry on agricultural meteorological research. The main topics discussed in this paper are as follows: 1) Climatic influences related to the growth and yield of crops. 2) Micrometeorological observations and analysis of the air layers near the ground. 3) Phenological and ecological studies of crops, animals and insects. 4) Variation of meteorological factors in relation to the quality of agricultural products. 5) Studies of adverse weather and special weather prediction for agricultural purposes. *Subject Headings:* 1. Agroclimatological research 2. Microclimatological research.—*Author's abstract.*

10N-70

551.585.5:00

Dickson, B. T., *Australia-UNESCO Symposium on arid zone climatology.* *Australian Journal of Science*, 19(4):145-146, Feb. 1957. **DLC**—A report on the UNESCO Symposium on Arid Zone Climatology that was held in Canberra, from Oct. 17-20, 1956. The subject dealt with was the biological application of microclimatology. The organization of the meeting and the symposium are described briefly. A list of the various discussions and of the participants is presented. *Subject Headings:* 1. Arid zone climatology symposia 2. Microclimatology.—*I.L.D.*

10N-71

551.586:551.584.4:583

†Knapp, R. (Germany), *Allgemeine Phytobioklimatologie (Probleme, Methoden und neue Arbeitsergebnisse).* [General phytobioclimatology: problems, methods and new scientific results.] *International Journal of Bioclimatology and Biometeorology*, Leiden, Netherlands, Vol. 2 (Pt. 2), 1958:11 p. 211 refs. Also: Boyko, H. (Israel), *Ergänzung zum Referat von Prof. Dr. R. Knapp.* [Additions to Prof. Knapp's article.] *Ibid.* 2 p. **DWB**—On the basis of an extensive review of the scientific literature the author discusses present day research and conceptions on relationships between macroclimate and vegetation, including the distribution of species and the habits of plants as influenced by climate, the use of vegetation as a climatic index, etc.; phenology including the study of ecotypes, which represent genotypically different races of a given species; microclimate-plant association and plant stands; the influence of climatic variables upon physiological reactions of plants such as plant growth, blossoming, etc.; and the use of climatic chambers to determine experimentally the role of individual climatic variables on plant behavior. In a supplement to this paper H. Boyko discusses the work of ecological climatology, which stresses (1) the importance of the IE-factor, (insolation, exposure) especially in the Polar vegetation limits, and in arid zones, especially in latitudes 20-40° on both sides of the equator; and (2) the phenomenon of "underground dew" in arid regions. A casual interpretation of both these phenomena is presented with the aid of diagrams. *Subject Headings:* 1. Plant bioclimatology 2. Macroclimates-vegetation relationships.—*I.L.D.*

10N-72

551.551:551.586:638.2

Nishida, T. and Ota, T., *On the micro-aircurrent of the silkworm rearing room for earlier stage of the worms.* *Journal of Agricultural Meteorology*, Tokyo, 10(3/4):91-95, March 1955. 6 tables, 6 refs. In Japanese; English summary p. 95. **DWB**—The microair current of Gun-San type (Domoro type) silkworm rearing room has been investigated with Kata thermometer. Results obtained are: 1) In general, the microair current of the Domoro rearing room is always lower than that of the normal silkworm rearing room. On the 1st and 2nd feeding insecter, the rate of the microair current of the Domoro type is about 20-30% in the spring rearing season, 62-66% in the summer rearing season, 86-87% in the autumn rearing season, of the normal silkworm rearing room. The Domoro microair current magnitude of feeding larva 3rd insecter and 1st-2nd moulting period can be increased or decreased. 2) Domoro air current horizontal distribution is largest at the front part, then back part next and least in the central part of the rearing room. It is also noted that the vertical distribution is seemingly largest at the lower part, then upper part and least in the middle part. 3) On the air current difference, the horizontal distribution is always smaller than that of the vertical distribution in the spring and autumn rearing season, and the reverse for the summer rearing season. 4) On the 3rd larva stage, we can increase the microair current by 10% by using the supplementary canal on the expel air canal. *Subject Headings:* 1. Silkworm rearing 2. Bioclimatology of silkworms.—*From authors' abstract.*

10N-73

551.584.42:633.52

Radinovich, N. F., **O fitoklimate konopli.** [Phytoclimate of hemp.] *Leningrad. Tsentral'nyi institut Prognozov, Trudy*, 37 (64):41-46, 1954. 5 tables. **DLC**—This study attempts to explain the differences in the temperature regime prevailing in a hemp field and over a bare plot. Meteorological data are presented for the Glukhov Meteorological Station (Sumsk Region, Ukrainian S.S.R.) including data for 1948 and climatic means. Data are given on the growth of a dry mass of hemp, evaporation from the soil surface and soil temperature and humidity; difference of mean daily temperature for different depths of soil as a function of height of plants, difference between mean daily soil temperature in a hemp field and a bare field as a function of height of plants, etc. *Subject Headings: 1. Field microclimatology 2. Hemp fields.—I.L.D.*

10N-74

551.584.43

Schütte, K. H. (*Univ. of Cape Town*), **Plants and their microclimates.** *South African Journal of Science*, Johannesburg, 54(2):28, Feb. 1958. "Summary of paper read at the Pretoria Congress of the South African Assoc. for the Advancement of Science, July 1957." **DWB, DLC**—Investigations in Bain's Kloof, Cape, S. Africa, gave data which led to conclusion that the air in and around vegetation occurs in layers that have different wind speed, temp. and evaporating power. A calm "friction layer" exists 1-3 in. above the ground; many plants allow wind to blow around them, leaving pockets of undisturbed air within. Some vegetation allows wind to blow through it. *Subject Headings: 1. Plant microclimatology.—M.R.*

10N-75

551.584.9:550.387

Testard, E., **Micro-climats particuliers. Impondérables aux séquences immenses.** [Special microclimates. Imponderables with important consequences.] *Revue de Pathologie Générale*, Paris, 58(700):1155-1165, July 1958. **DA, DNLM**—Spots situated straight above hydrotelluric currents of soil or at their ramification points constitute special microclimates with important consequences. Only certain trees or plants germinate and take root above them. An old example known is *Sambucus nigra*, elder tree. According to personal observations of the author, the *Vernum Lantana* and the *Lonicera Caprifolium* follow the same rule. The currents cause spectacular deformations on *Cichorium Intybus*, *Dipsacus sylvestris*, *Carduus nutans*, etc. *Subject Headings: 1. Microclimates 2. Telluric currents.—A.V.*

SOIL CLIMATES

SOIL MOISTURE

10N-76

551.501:551.579.5

Astakhova, N. I., **Raschet nedostatka vlagi v pochve do optimal'nykh vlagozapasov.** [Calculation of soil moisture deficiencies up to optimum moisture supply values.] *Kiev, Ukraine. Nauchno-Issledovatel'skii Gidrometeorologicheskii Institut, Trudy*, No. 17:63-67, 1959. 2 refs. **DWB**—In this study of the amount of moisture that is necessary to add to the soil during different developmental phases of winter wheat in order to maintain optimum moisture, the lower limit of optimum soil moisture was assumed as 70% of field capacity. The degree of difference of actual from optimum soil moisture content was investigated at a number of stations in the steppe zone of the Ukraine. The actual reserves of productive moisture under winter wheat lying fallow and the optimum soil moisture were compared for the four developmental phases, sowing-shrub formations, growth resumption, spike formation, spike formation-flowering, and flowering-waxy ripeness. Of the four stages only that of growth resumption-spike formation had an optimum soil capacity. The computation of the amount of moisture to be added was made by means of the formulas developed by S. A. VERIGO for the expenditure of moisture in the meter layer of the soil by decades, and can be expressed by equations. The application of these equations to supplement soil moisture during the difficult phases for the steppe zone of the Ukraine is discussed and numerical values are presented. *Subject Headings: 1. Soil moisture deficiency calculation techniques 2. Winter wheat cultivation.—I.L.D.*

10N-77

551.579.5:581.11(438)

Bac, Stanislaw, **Consommation d'eau par quelques plantes agricoles aux conditions des champs.** [Consumption of water by some agricultural plants in the field.] *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 1957, [Transactions]*, Vol. 2, pub. 1958. p. 381-386. 3 figs., 3 tables. **DWB**—Meteorological observations and research on humidity in Poland during a period of 6 yrs have proved that each plant species contributes a different amount of humidity during its course of growth. The author concludes that crop rotation, manure, the cultivated land area as well as the varieties of plants in any particular area constitute the major

factors that influence humidity in the soil while the unstable factors are the atmospheric factors. The report contains a graph and data on the average consumption of water and the amount of precipitation during the summers of 1950-1955 in Poland (51°2'N lat. 17°9'E long.). *Subject Headings: 1. Soil moisture 2. Plant water requirements 3. Poland.—N.N.*

10N-78

631.5:551.525:551.579)

Berényi, Dénes; Nagy, Lajos and Szász Gábor, *A talajművelés hatása a talaj hő-és vízgazdálkodására.* [Influence of cultivation on the heat- and water economy of the soil.] *Universitatis Debreceniensis de Ludovico Kossuth Nominatae, Acta*, 4:311-328, 1957. Issued Budapest 1959. 8 figs., 6 refs. German summary.—Regulating the heat and water economy in the soil is the basis of soil cultivation. During the first three years, research was carried on in sandy soil; the last year in loess. In cultivated soil, temperature falls on account of the increase of surface. Measurements made in many layers show that the falling of temperature is most important in superficial layers. There is no influence on temperature at 10 cm above ground level. The authors also give some information about the evolution of moisture in the soil with regard to the meteorological conditions. At 25 cm, cultivated soil presents a higher moisture content than a denuded soil. *Subject Headings: 1. Soil temperatures 2. Soil moisture 3. Soil cultivation methods—soil temperatures relationships —A.V.*

10N-79

551.579.5:631.411

Birch, H. F., *The effect of soil drying on humus decomposition and nitrogen availability.* *Plant and Soil*, The Hague, 10(1):9-31, Sept. 1958. 5 figs., 9 tables, 19 refs. **DLC**—Respirometer experiments show that when dry soil is moistened a characteristic pattern of decomposition occurs in which an initial period of relatively rapid decomposition (stage 1) falls, during a few days, to a slow steady rate (stage 2). This pattern is repetitive with successive dryings and rewettings and is common to all soils so far investigated. The magnitude of decomposition depends on the percent of carbon in the soil, and on the drying conditions, air drying being less effective than oven drying. A similar pattern of decomposition occurs under field conditions throughout successive wet and dry seasons. The operation and repetition of this pattern of decomposition in the field has important consequences in the rundown of soil carbon and the mineralization of soil nitrogen, particularly where well defined wet and dry seasons occur. These consequences are discussed in relation to climate and certain agricultural practices. *Subject Headings: 1. Soil moisture 2. Humus decomposition 3. Nitrogen availability in soil.—A.V.*

10N-80

551.579.5

Blanc, Milton L. (*Office of Climatology, USWB*), *Soil moisture reporting.* *U. S. Weather Bureau Weekly Weather and Crop Bulletin*, 46(13):7-8, March 30, 1959. table, 13 refs. **DWB, DLC**—Reviews the methods used in obtaining the original soil moisture data as published in the June 11, 1956 issue. It describes procedures used in reporting such information, and discusses the meanings of the various characteristics of crop land moisture conditions in general. *Subject Headings: 1. Soil moisture data 2. Soil moisture measurement techniques.—N.N.*

10N-81

551.579.5:551.455

*Bol'shakov, A. F., *Vodnyĭ rezhim pochv kompleksnoi stepi Kaspiiskoi nizmennosti.* [Water regime of soils in the complex steppe of the Caspian Depression.] *Akademiia Nauk SSSR, Pochbovennyiĭ Institut, Trudy*, 32:369-396, 1950. 5 figs., 10 tables, 19 refs. **DLC**—Detailed soil moisture data and isopleths during the vegetation period are given for microelevations and microdepressions. There is a remarkable difference in the moisture and salt regime and hence in the suitability for agricultural purposes, limiting agricultural activity in this region to the depressions. *Subject Headings: 1. Microhydrology 2. Soil moisture data 3. Semiarid regions 4. Caspian Depression, U.S.S.R.—A. Assur.*

10N-82

551.579.5:631.43:631.45

Bourget, Sylvio-J., *Facteurs physiques de la productivité du sol.* [Physical factors of soil fertility.] *Agriculture*, Montreal, 16(3):71-75, May-June 1959. 2 figs., 5 refs.—The physical properties of soils affecting their fertility are examined. Moisture, temperature, aeration and induration are the most important physical factors of soil fertility. Water in the soil is classified as subterranean water, gravity water, capillary water, hygroscopic water and water vapor. The problems set by drainage and irrigation in Quebec Province are outlined, and experiments made at Ottawa on soil temperature and the freezing of plants are described. These experiments prove that snow and air temperature are the two main factors exerting an influence on the temperature of the soil in winter. The composition of the soil atmosphere, the reactions and properties of soil affected by its aeration and induration are considered. *Subject Headings: 1. Soil physics 2. Soil moisture 3. Soil temperatures 4. Soil fertility.—A.V.*

10N-83

551.579.5

Butijn, J. and Wesseling, J., (*Inst. for Land and Water Management Research, Wageningen, The Netherlands*), **Determination of the capillary conductivity of soils at low moisture tensions.** *Netherlands Journal of Agricultural Science*, Wageningen, 7(2):155-163, May 1959. 2 figs., table, 15 refs., 16 eqs. DA—A method is described to calculate the capillary conductivity data from outflow measurements obtained with a suction apparatus also in use for the determination of the lower part of the moisture characteristics of soils. Measurements were made on different soil probes from the same profile. An approximate solution for the influence of the porous plate was introduced. The results of the measurements for a sandy soil and a sandy loam are given. *Subject Headings: 1. Soil moisture conductivity data 2. Soil moisture conductivity calculation.—Authors' abstract.*

10N-84

551.579.5:581.14

Chernoukov, A. M. and Nuzhdin, A. V., **K voprosu o podvizhnosti pochvennoy vlagi i dostupnosti ee dlia rastenii.** [Contribution to the mobility of soil moisture and its availability to plants.] *Pochvoedeniye*, Moscow, No. 4:98-101, April 1959. 2 tables, 13 refs. English summary p. 101. DLC—The analysis of previous work and the writer's experimental data on the moisture requirement of plants grown on structural and microstructural soils have shown that the process of supplying the plants with water is a complicated interaction between soil moisture and the root system of plants. When soil moisture is high, the supplying of plants with water is accomplished to a great extent by the capillary movement of soil moisture; at a low soil moisture level, this is chiefly accomplished by the movement of the root system to places where soil moisture is accumulated. By means of field experiments a water inflow (in the form of vapor) to the upper soil layers has been established amounting from 26-19% of the soil weight (this makes up 30-50% of the moisture evaporation from the upper layers during a day). It is evident that vaporous moisture plays an active role in rearrangement of water along the soil profile and in supplying water requirements of growing plants. *Subject Headings: 1. Soil moisture movement 2. Plant growth.—Authors' summary.*

10N-85

551.508.79

551.579:631.432.3:631.411.6(44)

Collier, D. and Robelin, M., **Contribution à l'étude de la dynamique de l'eau et des substances chimiques dans les sols argilo-calcaires de Limagne.** [Contribution to the study of the dynamics of water and of chemical substances in the chalky clay soils of Limagne.] *Paris. Institut National de la Recherche Agronomique, Annales, Ser. A, Annales Agronomiques*, 10(4):415-453, July/Aug. 1959. 7 figs., 7 tables, 12 refs. French, English, German and Russian summaries. DA, CU—This account of the results of lysimetric observations made during a period of 4 yrs at the Agricultural Station at Clermont, France, comprises two parts. The first deals with the dynamics of water, the second with the chemical substances of the Limagrian soils. In the first part, the authors give a description of the lysimeters (bare and cultivated surfaces) and outline the methods of establishing water balance and study the relations between evapotranspiration and yields. In bare soil, of a depth greater than the surface layer which is subject to alternate drying and wetting, evaporation depends only on climate, not on subsoil conditions. On a cultivated soil, these last conditions affect evapotranspiration, since the crops utilize moisture reserves from below the surface layer. Under similar climatic conditions, dry matter yields are proportional to the evapotranspiration up to the limit of potential evapotranspiration, except where excess water creates anaerobic conditions. Subsoil conditions, on the other hand, have a regulating effect on the depletion of mineral nutrients, by influencing the drainage and dry matter yields. *Subject Headings: 1. Soil moisture 2. Soil dynamics 3. Lysimeter investigations 4. Evapotranspiration-yield relationships 5. Limagne, France.—A.V.*

10N-86

551.579.5:632.1

†Couch, Houston B. and Bloom, James R. (*both, Penn State Univ.*), **Influence of soil moisture, pH, and nutrition on the alteration of disease proneness in plants.** *New York Academy of Sciences, Transactions*, Ser. 2, 20(5):432-437, March 1958. 22 refs. DLC—A brief review of literature. Experiments on the effects of varying soil moisture upon plant disease appear to indicate that "the role of soil moisture in alteration of disease proneness has yet to be adequately explored." *Subject Headings: 1. Soil moisture effects on plant diseases.—G.T.*

10N-87

551.579:631.4:581.14

Czenatzki, Walter, **Bodenphysikalische Probleme des Bodenwasserhaushaltes und der Feldbewässerung.** [Soil physics problems of the water economy of soil and field irrigation.] *Landwirtschaftsforschung*, Braunschweig Völknerode, Germany, 8(4):85-89, 1958. 4 figs., 8 refs.—In recent years an attempt was made to obtain information on the problem concerning the sprinkling of land under cultivation. The author gives an account of the limits of water available for plants in different soils. The water capacity of the soil seems very variable and depends on the amount and distribution

of precipitation, evaporation and water consumption by plants. The article gives a description of the calculation of the water balance of soil. Measurement of the moisture content of soil is of importance only insofar as it makes it possible to determine the necessity for watering. The content of soil moisture is easy in the upper soil layers; moistening of the soil to a depth greater than 60 cm is unprofitable. *Subject Headings:* 1. Water balance of soil 2. Evapotranspiration 3. Soil moisture requirements of plants 4. Plant growth.—A.V.

10N-88

551.524:551.579

Gardner, Robert, *Relation of temperature to moisture tension of soil.* *Soil Science*, 79(4):251-265, April 1955. 5 figs., table, 8 refs. *DLC.* Review in *Highway Research Abstracts*, Wash., D. C. 25(6):6, June 1955. *DWB*—The effect of temperature on soil moisture tension of three soils of constant moisture percentages was investigated in course sand, light sandy loam and wet mountain meadow muck. The tensiometers were provided with mercury manometers and were built according to the specifications of RICHARDS except for the elimination of metal shields and supports. The experimental data are presented in graphic form; they indicate "a consistent tendency for tension to decrease at approximately 0.008 atmospheres per degree rise in temperature within the range 10-50°C." The relationship of variation in tension to the direct effect of temperature on soil moisture tension on the one hand and to the indirect effect of temperature through temperature induced moisture gradients is discussed. *Subject Headings:* 1. Soil moisture tension 2. Temperature and soil moisture tension relationships 3. Tensiometers.—I.L.D.

10N-89

551.579.5:631.62(4)

Grigor'ev, A. A., *The reclamation of the forest belt of the U.S.S.R. in Europe.* *Geographische Journal*, 119(4):411-419, Dec. 1953. *DWB*—Owing to great excess of precipitation (ca 600 mm/year) over evaporation, soil is supercharged with moisture, especially in spring when snow melts. This has bad effect on soil, forming podzols. Boulders from the last Ice Age are also a difficulty. Methods of draining which also permit use of agricultural machinery are discussed, subsoil pipe drainage being preferred. Fertilizing soil, improvement of forests (including use of shelter belts), etc. are all considered. *Subject Headings:* 1. Drainage 2. Soil moisture 3. U.S.S.R.—C.E.P.B.

10N-90

551.579.5:551.573:551.55

Korte, Walter, *Klimatische Wasserbilanz. Ein Hilfsmittel zur Steuerung der Feldberechnung* [Climatic water balance. An aid in the regulation of irrigation.] *Landbauforschung*, Braunschweig-Völkenrode, Germany, 8(4):90-92, 1958. 4 figs., 8 refs.—After experiments made at Völkenrode from 1953-58, it was stated that a rational amount of field irrigation is secured by controlling the amount of water in the soil. By measuring the moisture content of soil (0-60 cm) it seems possible to obtain an idea of the water balance of the soil and plants, depending on rainfall and evaporation. Precipitation should be measured and evaporation must be deduced from the saturation deficit of the air, determining the magnitude of plant transpiration. The author gives a description of the different observations and shows how the climatic water balance can be a means of estimating the evolution of the water level without requiring soil moisture measurements. *Subject Headings:* 1. Water balance 2. Soil moisture estimation 3. Precipitation 4. Evapotranspiration 5. Völkenrode, Germany.—A.V.

10N-91

551.579:532.5(49)

Kraijenhoff van de Leur, D. A., *Het verband tussen hydraulica en hydrologie in de cultuurtechniek.* [The relation between hydraulics and hydrology in agricultural techniques.] *Landbouwkundig Tijdschrift*, Wageningen, 70(12):875-876, Dec. 1958. *DA*—The author describes the development of the concept of hydrology and hydraulics in the Netherlands. In connection with supplying water to dry sandy soils, in order to get new agricultural lands, he discusses the role of the hydrologist and the hydraulician. *Subject Headings:* 1. Hydrology 2. Hydraulics 3. Agriculture and hydrology 4. Netherlands.—A.V.

10N-92

501:551.579.5:5

Kulik, M. S., *Uchet uvlazhneniia sel'skokhoziaistvennykh polei.* [Calculation of moisture of cultivated fields.] *Meteorologiya i Gidrologiya*, Leningrad, No. 6:20-25, June 1957. 1 fig. *DWB*—With the aid of specific examples, the author discusses the inadequate knowledge of the moisture content of fields as a result of the uneven distribution of rainfall and its inadequate measurement (insufficient number of rain gages) and the lack of a suitable measure of drought. It is shown that crop yield is not an adequate measure of degree of drought. The inadequate concept of drought conditions results from difficulty in measuring soil moisture. The most widespread method of measuring soil moisture is the weight or thermostat method. This method provides measurement of soil moisture content of isolated local points which may not be representative of the surrounding

oil. The continuous measurement of soil moisture by radioactive methods (use of gamma rays) is proposed. *Subject Heading: 1. Soil moisture measurement techniques.—I.L.D.*

10N-93

551.586:63:551.579.5(47)

†Mastinskaia, S. B. and Razumova, L. A., *Ispol'zovanie v agrometeorologicheskoi i agrolimnitscheskom obsluzhivani sel'skogo khoziaistva dannykh o vlazhnosti pochvy*. [Use of soil moisture data in agrometeorological services for agriculture in the U.S.S.R.] (In: U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby, *Voprosy agrometeorologii*, ed. by F. F. Davitaia and M. S. Kulik. Moscow, 1954. p. 29-34. 44 refs.)—The results of experimental and observational investigations of soil moisture and plants have revealed fundamental laws involved in the formation of soil moisture as a function of weather and other elements during winter and summer. The decisive role of the movement of fluid water in the soil in replenishing water during winter and the untenability of the theory of the movement of water in the soil in vapor form were established. Depending on the nature of the supplies of soil moisture in winter there are three types of enrichment of soil with water by movement of water within the soil. These are as follows: intense enrichment (40-50 mm in winter) characteristic of regions of high moisture content and a shallow location of ground water; slight or insignificant replenishment (0-15 mm) due to the movement of water as a film and as vapor, characterizing regions with deep ground water and stable winter; and a transitional type, depending upon the water saturation of the soil during fall, is characterized by strong enrichment of ground water, with unstable winter producing excessive soil wetting during thawing. In regions of intense enrichment of soil moisture the excess water is eliminated in spring; in districts with slight enrichment of soil in winter the soil water content rises sharply. In soil with transitional water enrichment in winter there is a slight increase in moisture in spring. The laws of the formation of supplies of soil moisture in individual developmental periods and quantitative dependence of the change in supplies of productive moisture (y), upon air temperature (a), precipitation (b), and initial moisture supplies (c) for black soil and other soil regions have been established for the warm season. Quantitative relationships have been established between the condition of crops at different developmental stages and moisture supply at different depths of soil. On the basis of the distribution of soil moisture content in the U.S.S.R. four agrohydrological zones have been distinguished. These include zone of water supply by high ground water, zone of capillary moisture supply, zone of complete spring moistening and zone of unsaturated soils. *Subject Headings: 1. Soil moisture—plant growth relationships 2. Agricultural hydrology 3. Soil moisture formation 4. U.S.S.R.—I.L.D.*

10N-94

551.579.5:631.4

Morel, Robert and Masson, Pierre, *Relation entre l'humidité des sols en place et le taux de matière organique dans les parcelles du champ d'expériences de la Station Agronomique de Grignon*. [Relationship between the moisture of soils in situ and the total amount of organic materials in plots of the experimental field of the Agronomical Station at Grignon.] *Académie d'Agriculture de France, Paris, Comptes Rendus*, 45(2):73-78, Jan. 21, 1959. 4 tables. **DLC**—Investigation of the water retention capacity of the various experimental plots at the Agronomical Station at Grignon, France, and more particularly of those where the proportion of nitrogen is most distinct. Retention capacity has been inferred from the evolution of the humidity rate after rainy periods. Measurements show clearly a rise in retention capacity according to the total proportion of nitrogen. Linear regression of the total proportion of nitrogen on retention capacity is very significant. Measurements made during frost periods have confirmed that frost heaving of soils is caused by the upward migration of water from the deeper layers. *Subject Headings: 1. Soil moisture—nitrogen content relationships 2. Frost heaving 3. Nitrogen content of soil 4. Grignon, France.—A.V.*

10N-95

551.573:551.482.2:627.81

Morton, J. D., *The storage and abstraction of water conserved in sand rivers in the Gwanda District*. *Rhodesia Agricultural Journal*, Salisbury, 55(4):399-406, July/August, 1958. 3 figs., 4 tables, 4 refs., eqs. **DLC**—The rainfall in the Gwanda District varies from 25 in. in the northern section, to 10 in. per annum in the extreme south. Cattle ranching, which is the main occupation in this district introduced the problem of "sheet erosion," largely responsible for the silting up of the rivers. Research has been carried out on the storage and evaporation of water in open water reservoirs and sand beds. Water stored in sand is not as susceptible to evaporation as open water, as shown in tables and graphs. Investigation on the abstraction of water from sand storage led to the formula:

$$K = \frac{Q \log_{10} R/r}{1.36(D^2 - d^2)}$$

where: K = coefficient of permeability in a horizontal direction in feet per day; r = radius of well point in feet; R = radius of circle of influence in feet within which the ground water has been lowered by pumping; d = depth of water at well point in feet; D = depth of water beyond the circle of

influence in feet; Q = discharge of well point in cu ft per day. When the well point is placed fairly near the bank of a river, the formula becomes:

$$K = \frac{2Q \log^{10} R/r}{1.36(D^2 - d^2)}.$$

Specific yield tests were made on the availability of water in various types of sand encountered in the district. The use of well points is indicated as by far the most efficient method of abstraction of water from sand. *Subject Headings:* 1. Water storage 2. Soil moisture 3. Evaporation from reservoirs 4. Gwanda District, Rhodesia.—A.V.

10N-96

551.577.38:551.579.5(74) 631.6

*Palmer, Robert S., *Agricultural drought in New England*. New Hampshire. Agriculture Experiment Station, Durham, Technical Bulletin No. 97, Aug. 1958. 51 p. 19 figs., 10 tables, 1 refs., eqs.—The purpose of this publication is to present data which should prove useful in evaluating the need for irrigation in New England. The BLANEY-CRIDDLE formula has been used to determine the seasonal soil moisture requirements of crops at fifteen locations within the region. Crop moisture needs have been correlated with the effective seasonal rainfall to determine the seasonal soil moisture deficiency. Three crop coefficients, representing different types of crops, and five soil groups, representing soils with available water holding capacities of 1-5 in. of water in the root zone depth, have been used. Frequency distributions for the length of moisture deficient periods, the number of moisture deficient days and the amounts of soil moisture deficiencies during the growing season are presented. The information evolved may be used to guide irrigation designers and engineers. *Subject Headings:* 1. Soil moisture deficiency 2. Irrigation requirements 3. New England.—Author's abstract.

10N-97

551.577.3:551.579.5

Protserov, A. V., *O koefitsiente usvoeniia pochvoi osadkov, vypadaushchikh v raione orosheniia Iuzhno-Ukrainskogo i Severo-Krymskogo kanalov*. [On the coefficient absorption by the soil of precipitation falling in the irrigation areas of the South-Ukrainian and North-Crimean canals. *Meteorologiya i Gidrologiya*, No. 5:22, 1952. 2 tables, 3 refs. **DLC**—The degree of precipitation absorption is too low but the value of this absorption is determined differently by different workers. For example, V. M. OBUKHOV assumed that the plants transpired about 0.5 of the precipitation amount; A. M. ALPAT'EV in his observations at Ural noticed that daily precipitation less than 3.6 mm cannot penetrate more than 2-3 cm of soil and is useless for the root system of vegetation and V. I. POPOV proposed a change of terms and suggested "coefficient of effective precipitation" to represent the relation between the amount of precipitation transpired by plants and the total amount observed during the period. He determined that the value of this coefficient, for southern regions of the Ukraine, is most probably between 0.20-0.28. Observations of soil moisture made by the author during the growing season of 1950-51 have shown that the effective coefficient of precipitation varied within wide limits. In the plowed soil it was 50-60%, for a wheat field 35-45%, and in forest soil 40-50%. Precipitation less than 5 mm per pentad is useless. Showers with daily amount of more than 30 mm cause intensive runoff and therefore are insignificant for vegetation. For calculation of irrigation norms for the Southern Ukraine and the Northern Caucasus, during the growing season the seasonal precipitation amount must be diminished by 10% and then a coefficient of 0.7 or 0.5-0.6 must be taken into account. *Subject Headings:* 1. Rainfall variations 2. Soil moisture 3. Ukrainian S.S.R. 4. Caucasus, U.S.S.R.—N. T. Zikeev.

10N-98

631.51:551.525.4:551.579.5

Ryzhkina, A. I., *Agrometeorologicheskie usloviia na khlopkovom pole pri bezotval'noi obrabotke pochvy*. [Agrometeorological conditions in a cotton field tilled without the use of a moldboard. *Meteorologiya i Gidrologiya*, No. 2:29-34, Feb. 1957. 5 figs., 3 refs. **DWB, DLC**—Analyzes the effect on soil moisture and temperature of ordinary plowing with turning over of the soil to a depth of 40 cm, and the effect of plowing to a depth of 40 cm without turning over of the soil. Temperature was measured at the soil surface and at depths of 5, 10 and 20 cm below the surface, soil moisture to depths of 20 cm, and atmospheric temperature to a height of 20, 50 and 150 cm. Observations were made May-Oct. every fifth day, at 8 a.m., 2 p.m. and 5 p.m. The variation of soil moisture at depths of 5 cm, 10 cm and 20 cm and the variation of maximum and minimum temperatures of the atmosphere above the ground are presented by means of graphs. It is shown that in soil plowed without turning over of the soil layers, the soil moisture was greater than in soil plowed with turning over at a depth of 5 cm; at a depth of 20 cm soil plowed without turning over of the soil layers had the highest moisture content. The mean monthly temperature at 5 cm was the same in both kinds of plowing; at a depth of 10 cm the soil temperature was lower in the soil plowed without

turning over than in the soil plowed with turning over; the same was true for the 20 cm depth. The air temperature of the ground differed little with both types of plowing at heights of 20 and 150 cm; but at 50 cm the air above the soil which had not been turned over was somewhat higher than that above the turned over soil. *Subject Headings:* 1. Plowing methods 2. Plowing effects on soil temperatures 3. Plowing effects on soil moisture 4. Soil.—I.L.D.

10N-99

551.508.79:551.579.5

Stolzy, L. H.; Cahoon, G. A. et al. (all, *Univ. of Calif.*), **Measurement of soil moisture.** *California Agriculture*, Berkeley, Calif., 11(4):21-22, 37, April 1957. 3 figs. DWB, DLC—Two types of instruments are indicated to measure soil moisture. First is a tensiometer, a term which applies to an instrument consisting of a porous ceramic cup with a narrow neck joined to a section of tubing. The opposite end of the tubing is connected to a mercury manometer or to a vacuum gage. Second is the resistance block, which consists of two electrodes embedded in moisture blocks of an inert porous material or a slightly soluble electrolyte. Neutron thermalizing, a new method, can be used because neutrons are uncharged particles and have almost the same weight as a hydrogen atom, and also because most of the hydrogen in soil is in the form of water. On the basis of experiments graphically illustrated, it is concluded that the time and place to use either tensiometers or resistance blocks depend to a large extent on climatic conditions and soil types and to a lesser extent on the nature of the crop. The neutron method is still a research tool although it might be valuable on large agricultural acreages. *Subject Headings:* 1. Soil moisture measurement instruments 2. Soil moisture measurement techniques. I. Szuszkiewicz, T. E.—I.S.

10N-100

551.577.38:551.579.5

Strategy for drought. *Fortune*, N. Y., 4(4):160-163, April 1957. figs. DWB (P F745)—This is a popular presentation of JAMES BEALL's (U. S. Weather Bureau) equation as applied successfully to farming and crop yields in the southern Great Plains. Moisture vs. yield and some other meteorological factors influencing yield are discussed. The article is accompanied by two multicolor maps: one features rainfall amount and distribution, the other presents irrigation possibilities, and tabulated information on soil moisture as related to yield. *Subject Headings:* 1. Crop yield—soil moisture relationships 2. Drought prevention 3. Great Plains.—W.N.

10N-101

551.508:63 551.508.79:551.579.5

Tsukamoto, K.; Takahashi, K.; Tsuneoka, S. and Mitsudera, M., **Studies on meteorological instruments for agricultural use, Pt. 3, Automatic control system for soil moisture.** *Journal of Meteorological Research*, Tokyo, 11(5):381-386, May 1959. 5 figs., table, 9 refs. In Japanese, English summary p. 381. DWB, DLC—It is well known that the control of soil moisture in agricultural fields has a decisive influence on crops. There had existed no method of continuous measurement of the soil moisture without any modification of the field situation, until we devised a soil moisture meter which was described in the first report. In this third report, we present a system for automatic control of soil moisture. The system is composed of (1) sensitive element for soil moisture, that is, the main part of our soil moisture meter, (2) recording system for soil moisture, (3) time switch, (4) automatic irrigator, and (5) electric power supply. Principle of the system is as follows: The sensitive element for soil moisture which is placed in the soil is supplied with a certain amount of electric power at specific intervals by a time switch and is heated. Temperature increase of the element thus obtained, is detected by a recorder, the main part of which is an electronic recording ohmmeter, and an electromagnetic clutch is combined with the recorder. In case the recording pen of the recorder runs beyond a certain point, that is, in case soil moisture decreases beyond a certain limit, the clutch makes electrical contact and operates as an electromagnetic valve in order to give a certain amount of irrigation. *Subject Headings:* 1. Soil moisture measurement instruments 2. Soil moisture conservation techniques.—Authors' summary.

10N-102

551.579.5:63 546.17:63

Van Hoorn, J. W., **Results of a ground water level experimental field with arable crops on clay soil.** *Netherlands Journal of Agricultural Science*, Wageningen, 6(1):1-10, Feb. 1958. 5 figs., 4 refs. DLC—A description is given of the results of a ground water level experimental field on a heavy clay soil. The varying influence of the depth of the water table on the yield of various kinds of crops is mainly determined by the influence of nitrogen on crops and by the level of nitrogen dressing used. The lower yield caused by a shallow water table can be almost completely compensated by increasing the nitrogen dressing. It may be possible to compensate this entirely by applying more liberal dressings of other nutrients. When the water table is shallow there is a decrease in the percentage of large pores and permeability. If the ground water level is kept at a depth of 40 cm throughout the year, the soil structure of the surface layer deteriorates and tillage

becomes difficult. *Subject Headings:* 1. Ground water variations 2. Nitrogen content of soil 3. Water table depth—crop yield relationships 4. Soil moisture—nitrogen content relationships—A.V.

10N-103

551.579.5:551.525.4:631.44:634.9(577)

Veredchenko, Iu. P., *Osobennosti agrofizicheskikh svoystv, vodnogo i temperaturnogo rezhimov pochv Krasnoyarskoi lesostepi*. [The peculiarities of agrophysical properties of the water and temperature regime of the Krasnoyarsk forest-steppe soils.] *Pochvovedenie*, Moscow, No. 9:29-40, 1957. 4 figs., table, 10 refs. English summary p. 40. **DLC**—The water-temperature regime of the Krasnoyarsk forest-steppe soils and of the adjacent subtaiga (Middle Siberia) are substantially different from the regime of their analogs in the European part of the U.S.S.R. This is due for the most part to severe winters and to deep and long lasting soil freezing: in the forest steppe up to 2.5-3.5 m during 9-10 months, and in the subtaiga up to 1-1.5 m during 7-8 months. The soil freezing depth which is greater in the forest steppe than in the subtaiga is due to a lesser snow cover which is completely blown away on the open ploughed areas. These soils are always highly moistened at the depth of 1-1.5 to 2-2.5 m and show a decrease in moisture at the depth of 4-6 m. The period of optimal temperatures ($+110^{\circ}$) in the soils lasts only 3.5 months. This results in a weak development of the microbiological processes in the soil and reduces to a minimum pre-sowing and post-harvesting technical measures. *Subject Headings:* 1. Forest soil moisture 2. Soil temperature regime 3. Krasnoyarsk Territory, A.S.S.R.—*Author's summary*.

10N-104

551.579.5(584.6)

Zhuchenko, K., *K voprosu o vodnom rezhime chernozemnykh pochv pri razlichnykh sposobakh ikh obrabotki*. [The effect of various tillage methods upon the water regime of chernozem.] *Pochvovedenie*, Moscow, No. 6:97-102, June 1959. 7 tables. English summary p. 101. **DWB, DLC**—In the ordinary heavy loam chernozems of northern Kazakhstan the accumulation of moisture is obtained by autumn-winter-spring precipitation. The use of moisture by the plants depends primarily upon the time of development of their secondary root system. The movement of moisture in the liquid state into the zone of root desiccation stops when soil moisture attains 0.8% of the field moisture capacity. Below this range moisture consumption from different horizons of the soil profile is only possible when these are penetrated by the root hair. *Subject Headings:* 1. Soil moisture balance in chernozem 2. Kazakh S.S.R.—*Author's abstract*.

SOIL TEMPERATURE

10N-105

551.524.2:551.525.3

†Gutman, L. N., *K teorii rascheta temperatury pochvy*. [Theory underlying soil temperature calculation.] *Akademiia Nauk SSSR. Geofizicheskii Institut, Trudy*, No. 37(164):3-49, 1956. 3 tables, 46 refs., numerous eqs. **DLC**. Transl. into English in *Soviet Research in Geophysics*, N. Y., Vol. 1, 1960, issued by Consultants Bureau, p. 1-57. **DWB (M11.3K46co)**—The theory underlying the calculation of soil temperatures at various depths from the ordinary synoptic air temperatures is presented. The computational formulas are based upon a system of equations describing the distribution of heat in the atmospheric layer near the ground, in snow (if a snow cover is present) and in the soil. In contrast to previous studies devoted to this problem, the present study takes into account the temporal variation of the snow cover, of the coefficients of temperature and heat conductivity of snow and soil, and of the turbulence of the atmospheric layer near the ground. The appendix contains a general solution in the form of algebraic linear infinite systems having an upper triangular matrix and also a solution according to the method of finite differences of integral equation belonging to the Volterra type with an infinite lower limit of the integral. The results obtained in the appendix are utilized in this study. *Subject Headings:* 1. Soil temperature calculations 2. Soil-air heat exchange.—*Author's abstract*.

10N-106

551.522

Kozma, Ferenc and Varga, H. Zoltán, *Megmuvelt és takart talajok hőmérsékletének napi menete*. [Daily variations of temperature in cultivated and covered soils.] *Időjárás*, Budapest 62(3):150-159, May/June 1958. 2 figs., 4 tables, 4 refs. Russian summary p. 150. **DLC**—Hourly values of soil temperature measured at depths of 2, 5, 10 and 20 cm during 24 hrs on July 5-6, 1957, in soils under different cultivation (ploughed, rolled, etc.) and with various covers (carbon black, aluminum, chaff, etc.) are presented and analyzed as to the level of significance of the differences observed. Cultivated soils were found to be generally warmer than covered ones. Dark covering materials warm up considerably but fail to transmit heat to underlying layers. *Subject Headings:* 1. Diurnal soil temperature variations 2. Soil temperature under various covers.—G.T.

10N-107

551.525.4:581.056.1

Kunkel, Günther (Valdivia, Chile), *Über die Hitzeresistenz einiger Pflanzen auf erodierten Böden und deren ökologische Ursachen*. [Heat resistance of plants on eroded soils and its ecological causes.] *Forschungen und Fortschritte*, Berlin, 32(1):8-11, Jan. 1958. 2 figs., 11 refs. **DLC**—The transition regions between central and southern Chile, especially the eroded red soils of the provinces of Concepción, Bio-Bio, Malleco and Cautin comprise an area which is apparently completely inimical to plant growth. Climatic characteristics of this area based upon a 3-yr record of observations made at the Estación Experimental de Ecología de la Universidad de Concepción in Mininco (Malleco Province) indicated temperatures of 72.2°C during Feb. 1954 at a depth of 1 cm at Mininco. The daily amplitude of soil temperature is more than 50°C, as contrasted with a daily amplitude of 15–20°C for atmospheric temperature. Although porous soil is a poor conductor, the highest temperatures were occasionally observed at a 30 cm depth. During the entire year the monthly mean temperatures at 20 and 50 cm depths were higher than corresponding means of air temperature. The ecological conditions under which pioneer plant associations exist are considered. Species are provided with special protection against growth injuring factors; for example a basal rosette protecting the growth node against the overheated soil (*Echinum vulgare*, *Plantago lanceolata*, etc.). Other plants apparently are physiologically heat resistant (*Avena*, *Briza*, *Hordeum*, etc.). The possibility is considered that the growth of some plants is favored by extremes of temperature. *Subject Headings*: 1. Plant resistance to heat 2. Diurnal soil temperature variations 3. Soil temperature extremes 4. Chile.—*I.L.D.*

10N-108

551.525:631.544:634.38

Nakazawa, S. and Onodera, F. (Tokyo Univ. of Agric. and Technology), *On the relation between the soil temperature and straw matting in mulberry field*. *Journal of Agricultural Meteorology*, Tokyo, 13(4):140-142, May 1958. 2 figs., 4 tables, 4 refs., eqs. In Japanese; English summary p. 142. **DWB**—We have analyzed the influence of straw matting in the western part of Tokyo on the course of mulberry growth during the summer. We have made experiments for lots, that is, straw matting, and no matting, in order to test the significant differences among them. The soil temperatures were observed at 9 every morning, at the soil surface, 10 cm and 20 cm below the surface. The soil moisture content was observed during the period between July 29 and Aug. 7 every 4 days at 10, at the soil surface, 20 cm and 40 cm below the surface. The analysis was carried out by the methods of analysis of variance. The difference of the soil temperature is shown, but there is no significant amount of variation among the mulberry leaf yields by the use of lots. *Subject Headings*: 1. Soil temperature under straw matting 2. Soil temperature measurements 3. Soil moisture 4. Mulberry trees 5. Tokyo, Japan.—*Authors' summary*.

10N-109

551.582.1(548.7):631.4

Panabokke, C. R., *A pedologic study of dry zone soils*. *Tropical Agriculturist*, Ceylon, 104(3): 151-174, Nov. 1958. 7 figs., 4 tables, 14 refs. **DA**—This article begins with a climatic sketch of the dry zone of Ceylon, with emphasis on the main characteristics of the pluviometric regime and the soil temperatures at different depths. The second part deals with geology, geomorphology, vegetation and hydrology. Soil profiles taken along a traverse from the watershed to the adjacent valley in a typical land unit of the dry zone have been studied in detail. Hydrological studies indicate that differentiation of the member series of the catena is primarily conditioned by variations in drainage. Factors influencing soil formation and profile development are discussed. *Subject Headings*: 1. Climatology of Ceylon dry zone 2. Rainfall distribution 3. Soil temperatures 4. Climatic effects on soil formation 5. Soil formation 6. Ceylon.—*A.V.*

10N-110

551.525

Tyrtikov, A. C., *Temperaturnyi rezhim pochvy v razlichnykh rastitel'nykh soobshchestvakh v Raione Igarki*. [Soil temperature conditions in various plant associations in Igarka region.] *Pochvovedenie*, Moscow, No. 6:35-42, 1957. 5 figs., 2 tables, 17 refs. English summary p. 42. **DLC**—In the light forests of the region of Igarka the soil is characterized by the presence of a considerably thick (10-20 cm) peaty horizon. This horizon is the main cause of low soil temperature during the vegetative period (as compared with the temperature of soils of the ploughed areas). The obstacle for raising temperature and warming the soil appears to be the continuous cover of mosses and lichens, as well as dense growth of trees and shrubs. The grass cover handicaps the warming up of the soil only slightly. The basic means for thermal amelioration of the soil in plant associations of Igarka region is suggested to be the acceleration of the mineralization processes of organic residues (peat horizons) in the soil and on its surface. Destruction of moss cover is advisable. *Subject Headings*: 1. Soil temperatures 2. Soil temperature under various covers 3. Igarka region, Krasnoyarsk Territory, A.S.S.R.—*Author's abstract*.

SOIL AND CLIMATE IMPROVEMENT

SOIL IMPROVEMENT, LAND PLANNING, LAND CULTIVATION

10N-111

551.511:551.525.5:551.578.466

Baranov, I. Ia., *Issledovaniia na stantsii Zagorsk*. [Research at the Zagorsk station.] *Akademiia Nauk SSSR. Mezhdunarodnyi Komitet po Provedeniiu Mezhdunarodnogo Geofizicheskogo Goda, Informatsionnyi Biulleten'*, No. 3:74-75, 1957. **DLC**—Problems of heat and moisture exchange between soil and the outer environment, the significance of these processes in the seasonal freezing and thawing of the soil, as well as the heat balance in the ground layer, the heat regime of the underlying surface and their interdependence will be studied at the Zagorsk Glaciological Station, near Moscow, organized by the Institute of Permafrost Studies of the U.S.S.R. Academy of Sciences, in accordance with the IGV program. Investigations of the snow cover, particularly of its dynamics and metamorphism, will be of particular interest. Some information on the organization and equipment of the station is included. *Subject Headings*: 1. Energy exchange earth-atmosphere 2. Soil freezing 3. Snow cover dynamics 4. Zagorsk, Moscow Region, U.S.S.R.—A.M.P.

10N-112

551.583.3:550.1:551.4 631.4(6)(88)

D'Hoore, J., *Pedological comparisons between tropical South America and tropical Africa. African soils*, London, 4(3):5-19, 1959. 2 charts. Text in French and in English.—This article draws pedological parallels between South America and Africa (intertropical regions). The author limits himself to phenomena comparable both in space and time which have not met with important variations during the Pleistocene, and particularly the geological bed rock and general morphology which are considered to be stable factors. The modifications of the surface layers subject to the successive climatic changes and to the changes in plant cover, show that in the African intertropical regions the climatic changes are principally limited to changes in moisture. During the Pleistocene all the soils in intertropical Africa were temporarily under humid or semihumid forests and most of these regions also experienced important drying periods. The morphological evolution of low and high regions, the comparison of the present wet, dry and desert climates show that the African continent brings out a more marked degeneration. Glaciations are unimportant, and volcanism is localized. The high regions are less rich; certain of these are even covered by depleted layers and others are too dry to be of any importance. *Subject Headings*: 1. Climatic changes 2. Pleistocene climate 3. Dry and wet climates 4. Geomorphology 5. Tropical soils 6. South America 7. Africa.—A.V.

10N-113

551.524.32:551.577.32:631.41

Sen, Abhiswar (*Indian Agric. Res. Inst., New Delhi*), *Influence of climatic factors on salinity of Indian soils*. *Indian Journal of Agricultural Science*, New Delhi, 28(1):61-72, March 1958. 4 figs., 2 tables, 19 refs. **DWB**—During the present investigation, soluble salt content of surface soils and average salt content of different depths of an entire profile of 5-ft depths of 43 virgin soil profiles collected from different parts of India have been correlated with average annual rainfall, average annual temperature, LANG'S rain factor and MEYER'S N. S. Quotients of the soil localities. Equations are given to express: 1) the combined effect of annual rainfall and temperature on the surface and profile average salinities of soils; 2) the relationship of surface and profile average salinities with rain factors of soil localities; and 3) the relationship of surface and profile average salinities with N. S. Quotients of the soil localities. Rainfall seemed to have a more predominant effect in determining the salinity of a soil than temperature. *Subject Headings*: 1. Temperature effects on soil salinity 2. Precipitation effects on soil salinity 3. Soil salinity 4. India.—From author's summary.

10N-114

551.556.4:551.311.3

Tanaka, S.; Tanizawa, T.; Sano, H. and Kakinuma, S. (*all, Kanto-tosan Ag. Exp. Station*), *Actual condition of the wind erosion*. *Journal of Agricultural Meteorology*, Tokyo, 14(3):101-104, Jan. 1959. 4 figs., table, 4 refs. In Japanese; English summary p. 104. **DWB**—A distinction should be made between the wind erosion in the interior and that along the seacoast. A wind erosion distribution chart covers the entire seashore area of Japan, and in the interior the wind often erodes the vast region Kanto-tosan Zone, Tohoku district and Hokkaido. Speaking of the Kanto-tosan Zone, Tochigi-ken, Gumma-ken and Saitama-ken have frequently been attacked by wind erosion, and their badly eroded tracts prove to be composed of diluvial soil, though some places are covered, over their top soil, with volcanic ashes, while the sandy tracts of the seacoast are vulnerable to wind erosion. Along the seaside tracts the windbreaks and the fences of heaped up sand play an important part in wind erosion protection. But in the interior the shelter hedges or the straw, or sometimes the boughs and branches are set up everywhere in order to prevent suffering loss, while the windbreaks are soon to be in Hokkaido only. The surface soil begins to fly about when the wind

velocity reaches 5-6 m/s, and when the soil holds less than 10% moisture; however, it will hardly blow away in case the top soil contains 30% moisture or more. Vaporization quickens as the temperature rises, so wind erosion is apt to occur. As a result of 50-60 mm of rainfall will give us the increased damage of wind erosion, though no harm appears under 100-120 mm of rain a month. Also, when wheat reaches 30 cm in height, the fields can escape the wind damage. Though we may have severe wind erosion at the beginning of clearing virgin soil, its harmful power will decrease as time goes on. It is because the crop grows better with increased fertilization and the windbreaks of the farm wood or the sheds or barns, including the stables, may be built up, which result in protection from the high wind. Therefore, we don't regard it as appropriate to conclude that the root cause of the wind erosion retreat is due to the natural expansion of anti-wind erosion. The wind erosion has been destroying the arable land and its harvest year after year, and consequently we should keep investigating how to get rid of its attack so as we can have greater productivity. *Subject Headings: 1. Soil erosion 2. Soil erosion prevention 3. Japan.—Authors' summary.*

10N-115

551.556.4:551.311.3

Tanaka, S.; Sano, H.; Tanizawa, T. and Kakinuma, S. (all, Kanto-tosan Ag. Exp. Station). **Wind erosion for width of the row spacing (Studies on the control of wind erosion, Pt. 6).** *Journal of Agricultural Meteorology*, Tokyo, 14(3):96-100, Jan. 1959. 3 figs., 4 tables, 5 refs. In Japanese; English summary p. 100. (For Pt. 1, see 9.11-266, Nov. 1958, Pt. 2-5 see 11.1-116, Jan. 1960, *Met. Abs.*) DWB—Erodibility has been checked under six testing plots: 4.0, 3.0, 2.5, 2.0, 1.0, and 0.6 shaku-breadth between wheat rows, with results as follows: 1) In wheat rows which are less than 5 m above the ground, wind speeds are reduced in proportion to the distance between ridges, but no change is seen in its velocity in case the rows grow higher than 75 m. 2) The greater the distance between ridges, the greater the amount of soil which naturally flies, but there is a decrease of about 50% in the amount of flying soil between the 1-shaku or less ridge width and the 4-shaku one, and the flying soil changes the shape of the vertical section of the ridge; in the rows, the center becomes lower due to the newly blown off soil which accumulates rather high in front and back of each wheat plant. 3) Although the distribution of the wheat root system in 0.6-shaku ridge width grows thicker and more intricate, like a stretched net, near the surface of the field, than in 2.0-shaku width of the ridge, the roots in the latter go down deeper than those of the former. 4) Narrower ridge width brings less wind erosion, because the wheat forms a windbreak and its surface creep is well controlled by its stalks and blades, while the roots hold the soil fast, which levels up anti-wind erosion efficacy. *Subject Headings: 1. Soil erosion 2. Soil erosion prevention 3. Japan.—Authors' summary.*

10N-116

551.582:631.4

Terra, G. J. A., **Enige ontginningsobjecten op zoute en verzilte gronden in de tropen, mede in verband met klimaat en bodem.** [Some considerations about the reclamation of saline soil in the tropics in keeping with the climate and the soil.] *Landbouwkundig Tijdschrift*, Wageningen, 10(Extra No.):519-527, July 1958. DA—An increase of western agricultural production is possible employing modern techniques in cultivation. In densely populated regions it is necessary to perform operations, not very productive in the beginning, but giving better yields later on. The author comments on some possibilities at Kuttanad, India (rainy climate); Calcutta, India (heavy rains and long dry periods); Guanica, Puerto Rico (dry region); Saurashtra, India (very dry, little rain). *Subject Headings: 1. Land reclamation 2. Climatic influences on soil 3. Tropics.—A.V.*

10N-117

551.5:711

U. S. Dept. of Agriculture, **Land: the Yearbook of Agriculture, 1958.** Wash., D. C., 1958. 105 p. figs., photos, tables. DWB, DLC (S21.A35). Review by Francis Joseph Weiss in *Science*, Wash., D. C., 129(3341):91-92, Jan. 9, 1959.—In this attractive collection of articles, photographs and maps on land use, forests, resources, soils, and conservation in the U. S., several sections deal with climate of Alaska (p. 426-428), of Hawaii (p. 440), of Puerto Rico (p. 449), of the U. S. (p. 12-15, with a map on p. 17). Crop insurance against hail, wind, excess moisture, heat, floods, lightning, etc. is discussed on p. 234-237, and floods and drainage problems are discussed on p. 348-355. *Subject Headings: 1. Climate and land use 2. Crop insurance 3. Yearbook of Agriculture.—M.R.*

10N-118

551.58:63(64)

Vernisse, Jean, **La mise en valeur agricole de la plaine du Rharb.** [Agricultural development of the Rharb plain.] *La Terre Marocaine*, Rabat, 31(329):123-129, April 1957. 2 figs. DLC—The Rharb is the Moroccan plain delimited by the Loukkos at the North, Mamora's forest at the South and the Atlantic Ocean at the West. The agricultural importance of the Rharb plain depends essentially on the conditions of the physical medium. This article includes a short survey of the geology of this region, its orography, its pedology and its climate. Among the problems bound to agricultural development one must especially mention hydrology, flood prevention, and irrigation. *Subject Headings: 1. Agricultural development 2. Rharb Plain, Morocco.—A.V.*

10N-119

551.58:631.611

Vink, A. P. A., **De grond als factor in het ontwikkelingsplan.** [Soil as a factor in development projects.] *Landbouwkundig Tijdschrift*, Wageningen, 70(Extra No.):513-518, July 1958. 2 figs., 1 table, 17 refs. **DA**—For the transfer of knowledge and experience about the use capabilities of the soils from other regions, a soil survey is essential. The soil survey should be executed with the best available methods. The pedological analysis of aerial photographs in most of the underdeveloped regions reduces the time needed for field work to about 25%. The interpretation of soil maps and the combination of soil data with climatological and economic data are called "Land classification." There are various kinds of development projects, with varying influence on existing systems of farming in a region. The most extensive project is the colonization of uninhabited regions. One should also consider the problems arising in existing types of farming as a consequence of changed economic conditions. All these factors have an influence on the actual use capabilities of the soils in a specific region. Technical and economic aspects must be considered together to get the best possible results. *Subject Headings:* 1. Land classification 2. Agricultural development 3. Pedological analysis.—A.V.

IRRIGATION

10N-120

551.579:631.67(73)

Ackerman, Edward A., **Water resource planning and development in agriculture.** 1958. 19 p. Reproduced from typescript. Prepared for AAAS, Section O-Agriculture, Washington, D. C. December 29-30, 1958.—The author illustrates the need for further water resources planning that will affect U. S. agricultural development programs since moisture is vital to cultivation. He discusses the importance of the use of irrigation in the future and the problems associated with agricultural economy. *Subject Headings:* 1. Water supply 2. Irrigation 3. United States.—N.N.

10N-121

551.58:631.6

Criddle, Wayne D., (U. S. Dept. of Agriculture, Utah State Agri. College, Logan), **Influence of climate on irrigation agriculture.** *American Society of Civil Engineers. Irrigation and Drainage Div., Journal*, 84 (Paper No. 1504), Jan. 1958. 5 p. **DLC**—The history of irrigation in America from the Indians of the Southwest to the Mormons of Utah (1847), and in the eastern U. S. where it is called "supplemental irrigation," and peculiar problems of irrigation caused by varying rainfall regimes in various parts of the U. S. are discussed. Frost, daylight, humidity, dew and wind affect irrigation practices but not as much as precipitation. Irrigation, conversely, may affect climate as in sprinkling or irrigating to reduce frost hazard, or as in the case of early spring irrigation from mountain snow melt when it may chill crops on mountain meadows which are irrigated. *Subject Headings:* 1. Irrigation effects on climate 2. Climate effects on irrigation.—M.R.

10N-122

551.579:631.6(665)

Durand, J. H. and Simonneau, P., **Les périmètres irrigables expérimentaux du Sahara occidental** [Experimental irrigable areas of West Sahara.] *Terres et Eaux*, Algiers, 9(31):10-33, 1958. charts, 44 photos., 4 tables, 7 refs. **NN**—The Hydraulic and Rural Equipment Department initiated in 1953 pedological and agrological tests at some points of West Sahara, where the presence of deep flowing water in sufficient amounts and of good quality would allow for the setting up of well irrigated areas. Investigations of the same kind were mainly carried out at Igli and at Adrar, in the South Oran district in spite of numerous difficulties encountered, e.g., remoteness, climate, lack of trained personnel, etc. Soils were analyzed and investigated, as was water serving for irrigation. Several kinds of cultivation were undertaken: trees for timber supply and fences, date palm trees, henna and various orchard plants. On the whole, results were satisfactory, provided some special techniques are applied, these being necessary in order to avoid an increase of salt in the earth, a factor which may become very important. Leveling, drainage and extensive irrigation work should precede an attempt to enhance the agricultural values of these regions. *Subject Headings:* 1. Agriculture hydrology 2. Irrigation 3. Pedology 4. Sahara.—Authors' abstract.

10N-123

551.579.5:631.6

Egberts, Ir. H., **Ontwatering in het centrum Boskoop.** [Drainage systems in the Boskoop area.] *Netherlands. Directie van den Landbouw, Mededelingen [van de] Directeur van de Tuinbouw* 21(4): 203-209, April 1958. 3 figs. **DLC**—The soil in the arboricultural center of Boskoop consists of peat covered with a topsoil layer of about 50 cm. The water control in this area constitutes a problem which is not easily solved because of the often entirely impermeable transitional layer between topsoil and subsoil, and the way in which the products are marketed. As a matter of fact even in the wettest periods of the year the arboricultural products must be cut and moved, so that the nurseries are often so heavily trampled that the soil texture may be completely spoiled. On draining can provide a solution of the problem. In the past quite a number of primitive drainage

systems have been tried; most of these, however, provided only a temporary solution at best. In recent years, however, a more up-to-date system has successfully been applied in a good many nurseries: the so-called closed drainage system. The principal advantages include an improved workability of the soil and consequently an earlier maturity of the crops, the possibility of mechanical soil tillage, and through a better root development, an improvement of the quality of the product.

Subject Headings: 1. Drainage systems 2. Boskoop, Netherlands.—A.V.

10N-124

551.525:551.579.5:631.4

Fujiwara, T. and Ōneda, N. (*Hokkaido Natl. Agric. Exper. Sta.*), **Soil temperature and physical properties of soil, depend on the different methods of irrigation at the field.** *Journal of Agricultural Meteorology*, Tokyo, 15(1):25-28, June 1959. 3 figs., 3 tables, 14 refs. In Japanese; English summary p. 28. **DWB**—Studies were made on the relation between the physical properties of soil and soil temperature in different methods of irrigation of the field. The results are summarized as follows: (1) Increasing the amount of irrigation water, causes the increase of soil moisture content, and on the contrary, the decrease of air content. On the other side, soil moisture content keeps rising to the saturation point then gradually falls down to a certain value. In this way it was determined that the difference of soil properties above mentioned consequently controlled, respectively, specific heat, thermal capacity, and thermal conductivity. (2) It should be emphasized that the greater the soil moisture content and percolation, the greater are thermal diffusivity and conductivity. (3) In regard to temperature of surface and interior of soil, it was observed that variation of soil temperature on the surface was very intimately connected with thermal capacity, and that the variation in the soil interior was influenced by thermal diffusivity. **Subject Headings:** 1. Irrigation effects on soil moisture content 2. Irrigation effects on soil temperatures.—Authors' summary.

10N-125

631.67:551.579.5:551.58(492.6)

Kaliskaart, C., **Subirrigation in the Zuider Zee polders.** *International Institute for Land Reclamation and Improvement, Wageningen, Publication*, No. 2, July 1958. 9 figs., 9 photos. French, German and Spanish summaries. **DLC** (TC878.Z8K3)—The Netherlands have a humid climate but during the growth season there are periods during which the deficiency in water is felt in agriculture. In the new Zuider Zee polders, supplying water to drought-sensitive soils has been undertaken in the form of subirrigation. The author shows that, in the case of the northeast polder, this process is to be preferred to other means of providing water or irrigation. The subirrigation process and the equipment required are described. Establishing this irrigation process necessitates the study of the relationships existing between capillary rise and water table, ditch water level, meteorological conditions and water table. The water level is established according to weather evolution and sensitivity of the soil to drought. **Subject Headings:** 1. Subirrigation 2. Infiltration 3. Zuider Zee, Netherlands.—A.V.

10N-126

551.556.2:551.573:631.67

L'vovich, M. I., **Regulirovanie vodnogo balansa oroshaemykh polei pri pomoshchi lesonasazhnenii, kak sredstvo umen'sheniia norm orosheniia.** [Regulation of the water balance of irrigated fields by shelter belts as a means of decreasing irrigation rates.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 2:29-44, 1954. 5 figs., 5 tables, 17 refs., eqs. **DLC**. Transl. into English by E. Feigl available for reference. 25 p. 5 figs. **DWB** (M73 L979re)—Investigations conducted in the Kamennaiia steppe of the U.S.S.R. on the effect of shelter belts on the water balance of agricultural fields are discussed. The 1950-51 observations of shelter belt results indicated a productive evaporation of 1370 m³/ha for a sheltered belt of spring wheat and trees, and 840 m³/ha for a similar plot in an open steppe, being in the proportion of 63% to 48% of the total quantity of evaporated water respectively. These results showed that the productive evaporation on the sheltered plot was higher by 250 m³/ha than in the open steppe. The unproductive evaporation was 100 m³/ha lower. The basis of this evaluation and the methods used in the experiments are outlined in this report. **Subject Headings:** 1. Shelter belt effects on irrigated fields 2. Irrigation effects on humidity 3. Evaporation from irrigated fields 4. Kamennaiia Steppe, U.S.S.R. I. Feigl, E. (transl.).—N.N.

10N-127

551.586:633.18:631.67

†Miyamoto, K. (*Miyagi Prefecture Agric. Experiment Station*), **Of the relation between temperature of irrigation water and the growth and yield of rice plant.** *Journal of Agricultural Meteorology*, Tokyo, 13(4):147-152, May 1958. 4 tables, 24 refs. In Japanese; English summary p. 152. **DWB**—Representative paddies in Shichigashuku Village, Miyagi Prefecture, irrigated continuously with water having various maximum temperatures (below 20°C; 20-23°C; 23-25°C; over 25°C) were observed to show the relationship between the water temperature and growth and yield of rice. Results showed: 1) The growth and yield of rice increased as the distance from the inlet water became greater, at the same time as the water temperature rose. However, the correlation

curve was parabolic, not linear. 2) The water of high temperature (over 26°) was conducive to good growth and yield. 3) The fertility of heads was also affected by the temperature of irrigation water. The tendency followed the pattern shown in 1). 4) The higher the order of tillering, the greater, in general, the injury caused by cold water. In the parts of the fields where water temperature was about 25°C, heads of both main culm and 1st-order tillers had almost the same fertility. Below 23°C, the majority of grains ripened only incompletely. *Subject Headings:* 1. Water temperature effects on rice culture 2. Rice culture 3. Shichigashuku, Miyagi Prefecture, Japan.—From author's abstract.

10N-128

551.579:551.311.2:631.6

†Mohrmann, J. C. J., *Irrigation par aspersion*. [Irrigation through sprinkling.] *Belgium Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 49(4):877-921, Aug. 1959. 5 figs., 15 photos, 39 refs. **DLC**—This study relates to the agricultural, technical and economic aspects of irrigation through sprinkling methods. Irrigation through sprinkling is compared to the classical irrigation systems. Author examines some problems in connection with irrigation through sprinkling, especially soil weathering, soil erosion, water, air and soil temperatures, and periods of vegetative dormancy. Investigation of the climatological and agrohydrological bases of irrigation through sprinkling, includes study of water requirements of the irrigated plants, the losses in water and the determination of the amounts and frequencies of sprinklings. The time at which sprinkling must start during the rainless season, irrigation during short drought periods, and sowing and planting before the rainy season sets in are considered. The problem of controlling the water content of soils is examined, especially the direct measurement of water in the soils, and the moisture balance. *Subject Headings:* 1. Irrigation 2. Sprinkling irrigation 3. Hydrologic regime.—A.V.

10N-129

551.579.5:631.67(211)

Mohrmann, J. C. J. (*Internat. Inst. for Land Reclamation and Improvement*), *Some aspects of sprinkler irrigation in tropical regions*. *Netherlands Journal of Agricultural Science*, Wageningen 7(2):118-133, May 1959. 5 photos. **DA**—In order to make the best use of the limited area of good soil in the tropics an intensive crop rotation should be aimed at. Sprinkler installations may prove extremely useful in order to start sowing or planting even before the commencement of the rainy season; or in order to tide over the crops in the event of delay in the onset of the rains. When the growing season is postponed to the second half of the rainy period it may be necessary to maintain the soil moisture content at the right level by means of sprinkling during the transition period at the beginning of the dry period, etc. In preparing irrigation projects the choice of system will often depend on the topography, the character of the soil, etc. A number of pros and cons of sprinkler irrigation as compared with surface irrigation are discussed, emphasis being placed on the specific conditions which may occur in the tropics. Owing to the limited capacity of sprinkler installations it is sometimes a difficult matter to calculate what amounts of water should be applied and how frequently. In particular, the spray irrigation schedules for the short dry period and the transition period should be carefully prepared. The various types of sprinkling installations are mentioned insofar as they are of interest in the tropics. In conclusion some labor problems are discussed and a suggestion is made for cooperative sprinkling on small native farms. *Subject Headings:* 1. Soil moisture 2. Sprinkling irrigation 3. Tropical regions.—From author's abstract.

10N-130

551.584.43:551.573:633.

Nagaishi, Yoshitaka (*Kyushi Agric. Exper. Station*), *On depth of water requirement in paddy fields created by impoldering*. *Agricultural Engineering Society [of] Japan, Journal*, 27(2):60-61, July 1959. 8 figs., 7 tables, 7 refs. In Japanese; English summary p. 60.—The paddy created by impoldering is generally liable to suffer from shortage of water, and salt damage, due to the high rate of salinity, often occurs, too. Such being the case, sufficient irrigation water is required in the above areas where wells and creeks are being used, in general, as irrigation sources. Therefore, it is quite important to know the amount of water required in the paddy areas from the viewpoint of planning of irrigation source. The author made a comparative study between the experimental results in the area reclaimed earlier (Okazaki, Shiroishi-machi, Kishima-gun) and the area newly reclaimed (Ariake-polder, Shiroishi, Kishima-gun). Moreover, he estimated the water requirements in the reclaimed areas. He also made some estimates of the water required for the preparation of the land of the reclaimed paddy before the rice plant transplantation (Shirogaki-water). The results show that: 1) The value of

$$\frac{\text{Amount of evaporation from water surface } (E_p)}{\text{Amount of evaporation from evaporimeter } (E_m)} \times 100$$

in the paddy areas created by impoldering, where 64 stocks of rice plants were planted per about

3 m², is about 30-50% on an average, and that of

$$\frac{\text{Amount of evaporation from plant leaves } (Tp)}{\text{Amount of evaporation from evaporimeter } (Em)} \times 100,$$

out 70-80%. 2) The leaves of rice plants exerted an influence upon the amount of evaporation from plant leaves (Tp), the peak of which appeared in the maximum offshoot forming season or heading season, and the amount of consumption per one stock of rice plants a day is about 250-300 cc. 3) The water required for the land preparation of the reclaimed paddy before the rice plant transplantation (Shirogaki-water) may be estimated as about 200 mm. *Subject Headings: 1. Rice culture 2. Irrigation 3. Evaporation formulas 4. Japan.—Author's abstract.*

10N-131

631.67:633.18(52)

Nakahara, Magokichi; Tahara, Toraji and Nakazawa, Soichi, *Some problems on the farm irrigation*, Pt. 2. *Journal of Agricultural Meteorology*, Tokyo, 12(4):131-134, March 1957. 2 figs., 2 tables. In Japanese; English summary p. 134. DWB—In the summer of 1954, we continued our experiments on the farm irrigation programs using an upland rice field at Tokyo University of Agriculture and Technology. Although disturbed by bad weather conditions which prevailed in the early summer and typhoons in Sept., we got results to demonstrate the effectiveness of farm irrigation and also the differences of soil moisture and soil temperature by plots. (For abstract of Pt. 1, see 9-68, Sept. 1955, *Met. Abs.*) *Subject Headings: 1. Irrigation experiments 2. Rice culture 3. Japan.—Authors' abstract.*

10N-132

551.579:631.67:061.3(52)

Reclamation and melioration: abstracts of reports on land reclamation, irrigation and drainage Japan, No. 1, [1956?]. Latest issue seen, No. 3, July 1958. Annual. "Summary in English of the contents of the Japanese language *Journal of the Agricultural Engineering Society*." No. 3, 1958 corresponds to 1956 *Journal*. Ed. by Ryo Kaneko.—Illustrated and tabulated digests in English language are given of the 43 papers published in Japanese in the 1956 volume of the *Journal of the Agricultural Engineering Society*. Contents include articles on the following subjects: land reclamation, irrigation and drainage, hydraulics, soil mechanics, and structure. *Subject Headings: 1. Irrigation and drainage 2. Agricultural hydrology 3. Japan. I. Agricultural Engineering Society of Japan, Tokyo.—W.N.*

10N-133

551.579:631.67(45)

Sato, S. and Hunahashi, Y. (*Kyushu Agric. Exp. Station*), *Daily change of the net duty of irrigating water for the rice-field in midsummer*. *Journal of Agricultural Meteorology*, Tokyo, 12(3/4):124-126, Nov. 1952. fig., 2 tables, 4 refs. In Japanese; English summary p. 126. DWB—This experiment is a part of studies of the quantity of irrigating water for the rice paddies in the warmer district of Kyushu. The results shown in a table are the typical values on a clear day at the maximum tillering stage of rice. 1) The absorption of water by the plant is vigorous in the forenoon, decreases rapidly in the afternoon, and almost ceases in the early night. It recovers gradually at midnight. 2) The evaporation from the water surface in the field is about 45% of that measured with the evaporation gage of the "Japanese Observatory Type." 3) The percolation is dependent on topography, type of soil, climate and the depth of the ground water table. Much attention should be paid to percolation which is very intense and varies with locality. *Subject Headings: 1. Irrigation 2. Evaporation 3. Percolation.—Authors' abstract.*

10N-134

551.577:631.6:551.585.53(6)

*[Simaika, Y. M. (*Dept. Inspector-General, Nile Control, in charge of Hydraulic Researches, Egypt*), *Research in hydrology and fluid mechanics and development of underground water in the arid regions of North-East Africa*. (In: UNESCO, *Reviews of research on arid zone hydrology*, 1953, 12:42-57. map, diagr., 67 refs.) DWB—A map of normal annual rainfall is presented for Northeast Africa, north from the equator and eastwards from 26°E. Rainfall data are given for selected stations. The discussion is primarily concentrated on irrigation problems. The bibliography lists a number of climatological and hydrological papers. *Subject Headings: 1. Rainfall data 2. Arid zones 3. Irrigation 4. Nile River 5. Northeast Africa.—A. Assur.*

10N-135

551.577.38:551.579(493)

Sine, L. and Calembert, J., *Calcul des besoins en eau d'irrigation*. [Calculation of irrigation water requirements.] *Centre Belge d'Etude et de Documentation des Eaux, Liège, Bulletin*, No. 12(2):89-92, 1958. fig., 5 refs. DLC—The paper points out the present situation concerning the general methods of calculating the water deficit or the maximum irrigation needs. The authors discuss the interpretation of the results obtained in two particular cases in Belgium during 1957,

when irrigation was necessary many times. *Subject Headings:* 1. Irrigation 2. Water deficit calculation techniques 3. Belgium.—A.V.

10N-136

551.577:631.

Straus, Michael W., **Recent developments in irrigation.** (In: United Nations Scientific Conference on the Conservation and Utilization of Resources, Lake Success, N. Y. 1949, *Proceedings*, v. 4, **Water resources**, p. 369-375, 1951. 3 figs., 10 refs.) DWB—More land than water is available in many parts of the world and fresh water is the first fixed limit in food production. The author discusses irrigation in the United States in comparison with the average annual precipitation and gives a map showing the irrigated areas of the world. China, India and Pakistan lead all nations in the number of irrigated areas. The livelihood for more than 10% of the world's population is provided by irrigated areas. *Subject Headings:* 1. Irrigation 2. Water resources.—A. Assur.

10N-137

551.464:631.6:01

†UNESCO, **Reviews of research on problems of utilization of saline water.** [Paris, 1954] (Its *Arid Zone Programme*, No. 4.) 96 p. figs., 776 refs. DWB, DLC—This monograph contains three reviews, each provided with a very extensive bibliography. Contents are: 1) The biological and agricultural problems presented by plants tolerant of saline or brackish waters and the employment of such water for irrigation, by GEORGES GRILLOT; 2) Plant growth under saline conditions by H. E. HAYWARD; 3) Utilization of sea water, by EVERETT D. HOWE. *Subject Headings:* 1. Saline water utilization for irrigation 2. Irrigation 3. Bibliographies. I. Hayward, H. E. II. Howe, Everett D.—I.L.D.

WIND PROTECTION, WINDBREAKS

10N-138

551.556

Daigo, Y. and Maruyama (*Central Met. Obs.*), **On the straw fence as a wind-break in farm fields.** *Journal of Agricultural Meteorology*, Tokyo, 10(1/2):53-56, Dec. 1954. 3 figs., 5 tables. In Japanese; English summary p. 56. DWB—To protect the crops from wind damage, farmers often put up a straw fence around the field. Authors investigated the effect of having a fence around the field. Main results are as follows: 1) The variation of wind speed curves are more conspicuous in the difference between C plot (surrounded by fence) and A plot (no fence) and greater at night than daytime. This implies the effect of protection against wind at night is much greater than in daytime. 2) Prevention of dust. To measure the removal of dust from these plots, we used aluminum dishes (7 cm in diameter, 2 cm in depth) half filled with water to prevent blowing out of the dust by wind. The water is taken off by drier. Results are shown in tables. *Subject Heading:* 1. Windbreak effectiveness.—Authors' abstract.

10N-139

551.556.2:6311

Ferber, Arthur E. (*Soil Conservation Service*), **Windbreaks in conservation farming.** *U. S. Soil Conservation Service, Miscellaneous Publication*, No. 759, Aug. 1958. 22 p. photos. DWB (M84.41 U586wi)—The effectiveness and advantages of live windbreaks and snow fences as applied to farming and soil conservation are discussed and illustrated. Characteristics of various kinds of trees and shrubs are considered in relation to topography, climatic conditions, etc. of a local nature and from the point of view of particular uses including the decorative aspects in landscaping. It is concluded that live windbreaks are valuable wherever detrimental effects of wind are observed, be it summer or winter. *Subject Headings:* 1. Windbreak effectiveness 2. Soil conservation.—W.N.

10N-140

551.556.2:635.3

Schultz, Herbert B. and Carlton, Alan B. (*both, Univ. of Calif.*), **Wind protection for asparagus.** *California Agriculture*, Berkeley, Calif., 12(8):6,13, Aug. 1958. 3 figs. DWB—Soil erosion and air pollution are caused over the Delta Islands west of Stockton, Calif., by frequent strong winds which are highest during spring. Two methods were employed to modify the wind structure over bare ridged asparagus fields by means of low temporary windbreaks spaced at close intervals. In one method snow fences were installed at intervals, while the other consisted of planting fast growing barley between the ridged asparagus beds. To determine the effectiveness of the two methods vertical wind profiles were measured which permit the determination of the effects of soil surface roughness and drag on wind streams. Experiments show that snow fences improved the conditions by providing a modest lifting of the surface while in interplanted barley it was raised to about 5 ft above the asparagus ridges. Calculations by the power law, in which the exponent characterizes the surface roughness, resulted in a roughness increase by about 5% from both methods. The reason for their being so competitive could be different temperature stratification. The study is still in progress. *Subject Headings:* 1. Windbreaks 2. Vertical wind profile measurements 3. Snow fences 4. Wind protection for plants.—I.S.

10N-141

551.556.2:551.584.9:631.11

Thomas, David, **The assessment of shelter-need upon exposed farm sites.** *Weather*, London, (12):375-384, Dec. 1959. 8 figs., 2 tables, 9 refs. DWB—A report of the application of the flag sheltering technique to two farms of different types. The device originally used by the Forestry Commission's Research Branch to assess exposure, consists of measurements of the tattering rates of unhemmed flags. It partly supplements and partly replaces the estimation of exposure by tree crown deformation. The discussion consists of an analysis of the intensity of exposure on Pengalis farm and Blaendyttryn farm, both in West Wales. On the basis of this analysis it is concluded that the technique is sound, and is applicable to the very types of farm which would need exposure estimation in order to determine need for artificial shelter. Further, it is pointed out that the correlation of the results obtained for Blaendyttryn with those derived from tree deformation studies supports the validity of both approaches. *Subject Headings:* 1. Sheltering theories 2. Wind damage estimation techniques 3. Wales.—I.S.

10N-142

551.551:551.43

Yamamoto, R. (*Faculty of Ag. Nagoya Univ.*), **On the windbreak [of] the cultivated field in a hilly district, Pt. 3, The relationship between the wind and the topography.** *Journal of Agricultural Meteorology*, Tokyo, 14(2):69-73, Oct. 1958. 8 figs., table, 3 refs. In Japanese; English summary p. 73. DWB—The author studied the relationship between wind and topography, using various actual and model landforms, from an agricultural standpoint. The investigations were carried out in a hilly district of the Atsumi Peninsula, Aiti Prefecture, establishing many observation points on mounds and hillsides, in valleys and on level land. The observations of the wind were made mainly by using Nakaasa type anemometers and many streamers, partially with smoke. And in order to conduct investigations into the microbehavior of the wind, some indoor model experiments were carried out using a hot wire anemometer for the measurement of wind velocities. Results obtained were summarized as follows: 1) The relationship between an isolated hill and the wind around it is analogous to that between an object and the movement of water flowing around it. 2) In a valley, the wind generally blows along the ridges of the valley regardless of the main wind direction and its velocity slows down gradually under the influence of the topography. But if the direction of the valley coincides with that of the main wind and the valley is outside the range of influence of the ridge standing to windward, the wind blowing through the valley suddenly gains strength. 3) In a valley and a pass the properties of the wind differ greatly from those on the outside. 4) The air flow near the ground is apt to be influenced by the smallest undulation of the ground. We may turn this relation between the air flow and the undulation to the best account in preventing wind damage in the cultivated field. 5) Very often the direction and velocity of the wind change every hour. In that case the correlation between the wind and the topography changes accordingly. *Subject Headings:* 1. Orographic effects on wind 2. Micrometeorological turbulence.—*Author's summary.*

GREENHOUSE CLIMATE

10N-143

551.524:551.584.61:631.544.4

Arai, T. (*Training Inst. of Met. Observers*), **On the temperature in the frame.** *Journal of Agricultural Meteorology*, Tokyo, 11(4):124-126, March, 1956. 3 figs., 7 refs., 6 eqs. In Japanese; English summary p. 126. DWB—The details of the in and out flow of heat just at the ground surface in the open field and frame are shown and the well known formulas are found to hold true in each case. Assuming that the temperatures of the ground surface in the open field and frame were identical, the formula is obtained. Each side of this formula was calculated separately by the data measured on different days. When they are equal, the mean temperature in the frame on one day is equal to that in the open field on the other day. When the left side value is greater than the right, this heat difference must be introduced into the frame on one day, to get the same mean temperature of the open field on the other day. The calculated values from this formula, by using the diurnal mean data in Tokyo from 1876 to 1948, are shown. It is easily seen that the frame on March 1, is equal to the open fields on April 5, in respect to mean temperature, and that in order to get the mean temperature of the open field on May 1, the supplying heat in the ground surface of the frame is 160 calories. There is a question as to when the deficient heat is to be supplied. However it is clearly understood that this heat is to be added during the night as the diurnal amplitude of temperature on the frame is larger than that of the open field. *Subject Headings:* 1. Frame temperatures 2. Frame microclimatology.—*Author's abstract.*

10N-144

551.586:551.525.2:631.544:581.14

Chiba, T., and Azuma, Y. (*Hokkaido Nat. Agric. Exper. Sta.*), **A method of the determination of the electric power for raising seedlings in the electric hotbed.** *Journal of Agricultural Meteorology*, Tokyo, 15(1):29-33, June 1959. 5 figs., 4 tables, 4 refs., 12 eqs. In Japanese; English summary p. 33. DWB—The phase of heat balance in the electric hotbed was obtained from the

transition of the vertical temperature distribution. Heating the seed bed is needed chiefly during the night; temperature near the soil surface plays an important part in raising seedlings. Therefore, considering nighttime conditions, efficiency of the electric hotbed was defined as the ratio of calories which were emitted from the heater to the number which came into the soil layer of 6 cm in thickness, that is, from soil surface to the depth of 6 cm, of emitted heat. When the construction of the electric hotbed was decided upon, the efficiency was also constant for the various temperatures of the soil layer during the night. Formulas are given for the electric power necessary for efficient functioning of the electric hotbed. *Subject Headings: 1. Electric hotbeds 2. Seedlings.—Authors' abstract.*

10N-145

551.586:631.544.4(521.6)

Holmes, R. M. (Canada. Dept. of Agric.) and Robertson, G. W. (Canada. Dept. of Transportation). **Note on a portable field growth chamber for winter injury studies.** *Canadian Journal of Plant Science*, Ottawa, 38:377-379, July 1958. 3 figs. **DA**—Estimation of injury to wintering crops is no longer a matter of conjecture at the Field Husbandry, Soils and Agricultural Engineering Division, Experimental Farms Service, Canada. The field growth chamber described in detail here was designed and constructed by two staff engineers and was successfully tested in the winter 1956-57. The criterion of growth was development of crown cover of the crop. The electric heated and lighted field chamber is bottomless. It was put atop a 4 in. thick sheet of ice, beneath which 20 thermocouples had been buried. The inside temperature was held to about 70°F, and the light was on from 6 a.m. to 6 p.m. The ice sheet was gone in two days, and in seven days the temperature at 24 in. depth was 34°F. The outside mean temperature was 13°F, minimum -37°F. Revival of healthy well grown alfalfa occurred in 8-18 days. It is now feasible to check injury problems related to wintering crops. *Subject Headings: 1. Winter injury to crops 2. Growth chambers.—W.N.*

10N-146

551.586:551.584.61:631.544.4(521.6)

Ogusu, Z., **On the meteorological conditions in the agricultural vinyl-house, Pt. 1.** *Journal of Meteorological Research*, Tokyo, 9(12):890-893, Dec. 1957. 2 figs., table, 2 refs. **Pt. 2, Ibid.**, 10(1):67-69, Jan. 1958. 2 figs., table, 2 refs. In Japanese. **DWB; DLC**—Thermal insulation effects of agricultural straw mat, vinyl and polyethylene sheet-covered boxes (houses) are discussed with graphs of minimum air temperature and table of soil temperature at depth of 3 cm with polyethylene cover. The differences of minimum temperature (with and without covers) ranged from 0.5-8°C in various arrangements. The best effect is obtained by a combination of a vinyl sheet and a straw mat. *Subject Headings: 1. Greenhouse climates 2. Greenhouse temperatures.—J. Woo.*

PLANT GEOGRAPHY AND PHYSIOLOGY

PLANT PHENOLOGY

10N-147

551.506.8:912(437.2)

Brablec, Josef, **Dvě studie z fenologie.** [Two phenological studies.] *Meteorologické Zprávy*, Prague, 5(3):74-75, 1952. 2 tables, 2 refs. **DLC**—Phenological observations in Czechoslovakia have been in progress since 1923. Phenological maps were constructed from data obtained during the period 1926-1940. It is not enough, however, to know the average dates of phenological phases; the probability of their occurrence must also be considered. As an example the author presents two tables: (1) probability of occurrence of specified deviations from average phenological data for alder trees and winter wheat (Plumlov, Moravia, 1926-1947) and (2) dates of eight different phenological phases for each yr of the period 1930-1940 (Plumlov, 1930-1940). *Subject Headings: 1. Phenological data 2. Phenological charts 3. Plumlov, Moravia, Czechoslovakia.—G.T.*

10N-148

551.506.8(437.2) 551.506.8:03:485

Brablec, Josef, **Fenologický kalendář přírody Hodonína na Moravě.** [Phenological data for Hodonin, Moravia.] *Meteorologické Zprávy*, Prague, 5(2):44-46, 1952. 2 tables, 2 refs. **DLC**—Dates of 99 phenological events (mostly first blossom and general blooming of various trees or plants) are listed. The data give: (1) long-period average date of occurrence, (2) number of observations, (3) earliest and (4) latest dates. A glossary of Czech and scientific names of the plants is added. *Subject Headings: 1. Phenological data 2. Czech phenological glossaries 3. Hodonin, Moravia, Czechoslovakia.—G.T.*

10N-149

551.506.8(437.2) 551.506.8:03:485

Brablec, Josef, **Fenologický kalendář přírody Plumlova na Moravě.** [Phenological data for Plumlov, Moravia.] *Meteorologické Zprávy*, Prague, 5(1):12-20, 1952. 7 figs., 4 tables, 3 refs. **DLC**—Data on some 350 phenological phases (4/5 of them involving plants and 1/5 birds) a

culated for the period 1926-1947. "Phenodynamic" curves of blooming phases are presented for each yr; these curves show deviations of phenological dates from the 22-yr average date during May and June. A glossary of Czech and scientific names of plants and birds observed is added. *Subject Headings:* 1. Phenological data 2. Czech phenological glossaries 3. Plumlov, Moravia, Czechoslovakia.—G.T.

10N-150

551.501.45:551.506.8:632.9

†Brandtner, Erwin, *Methodische Untersuchungen an phänologischen Beobachtungen unter besonderer Berücksichtigung phytopathologischer Probleme*. [Methodological investigation of phenological observations with particular reference to phytopathological problems.] *Germany. Deutscher Wetterdienst, Berichte*, 7(47), 1958. 14 p. 7 figs., table, 30 refs., eqs. German and English summaries p. 3. **DLC**—Statistical analysis of phenological observations 1936-1954 in the Rhein-Main lowlands of Germany are presented and discussed in order to demonstrate a method developed for the control of crop and plant pests. The method forecasts the right time for action from observations of certain phenological phases and insects. Graphic and tabular data for several crops are given. Possible applicability of the method in other climatic regions is suggested. *Subject Headings:* 1. Phenological observations 2. Phytopathological problems 3. Rhein-Main lowlands, Germany.—W.N.

10N-151

551.506.8

Chang, Yeuch-ngo, *Notes on some botanic phenological observations in Taiwan Province, 1954-1957*. *Meteorological Bulletin*, Taipei, Formosa, 4(4):6-9, Dec. 1958. 5 figs. In Chinese; English summary p. 6. **DWB, DLC?**—Subject is discussed under 5 headings: 1) The first seed bed of Chailai rice. 2) The first harvesting of Chailai rice. 3) The first flowering of oranges. 4) The first flowering of peaches. 5) The first flowering of plums. *Subject Headings:* 1. Phenological observations 2. Taiwan, China.—*Author's abstract*.

10N-152

632.112:551.577.38 551.524.37

Durquety, P. M. and Magimel, R., *Action de films hydrofuges d'organo-siliciques sur le cycle végétatif et sur la résistance des végétaux à la sécheresse*. [Action of organo-silicic damp-proof films on the vegetative cycle and on the resistance of plants to dryness.] *Revue Horticole*, Paris, 29(2220):1734-1737, Nov.-Dec. 1957. 9 figs., 7 refs. **DA**—Account of a rapid study of the action of different organic compounds, in particular, of organo-silicics on the transfer speed of free iodine from the nervure to the parenchyma. The experiments have demonstrated that the action of these compounds was important and temporary; their result was to restrain the initial bud development, followed by a stage of normal growth speed. The intensity and duration of the phenomenon are adjustable, according to the concentration of the active body. Such a treatment leads, separately or simultaneously, to a retardation of the budding, the blossoming and the ripening of agricultural and horticultural plants. This delay is intended to avoid spring frosts; it shifts the growth cycle of the plant with regard to the climatic conditions and to the cycle of certain parasites. *Subject Headings:* 1. Phenological cycle retardation 2. Late frost protection 3. Drought resistance.—A.V.

10N-153

551.506.8 551.524:581.14

Ferguson, J. H. A. (*Inst. of Horticultural Plant Breeding, Wageningen*), *Empirical estimation of thermoreaction curves for the rate of development*. *Euphytica*, 7(2):140-146, July 1958. 3 figs., 10 refs. English summary p. 140; Dutch summary p. 146. **DA, CU, PU**—If the period during which a certain development of a plant takes place is considered, experience has shown that in many cases there is a strong correlation between temperature and rate of development. A method has been worked out to estimate from phenologic data a linear or curvilinear relation between the temperature and the rate of development. *Subject Headings:* 1. Plant development 2. Temperature-development rate relationships 3. Phenology.—*Author's abstract*.

10N-154

551.506.8:551.515.8:582.26

Kiss, István, *A növényi mikroszervezetek "idoérzékenységének" újabb ellenőrző vizsgálata*. [Re-examination of the "weather sensitivity" of plant microorganisms.] *Időjárás*, Budapest, 51(6):425-429, Nov./Dec. 1957. fig., 4 refs. English summary p. 425. **DLC**—An algal bloom described by another author with precise indication of the beginning date and the duration, is analyzed as to the meteorological relationships. Analysis shows that this algal bloom began in prefrontal weather, thus furnishing new support to the author's theory of a close connection existing between the mass production of microorganisms and prefrontal weather situations. *Subject Headings:* 1. Frontal effects on microorganisms 2. Phenological observations 3. Algae.—*Author's abstract*.

10N-155

551.506.8(49)

Kubicek, H., *Phänologischer Bericht für das zweite Halbjahr 1951 von der Beobachtungsstation Petzenkirchen*. [Phenological report by Petzenkirchen Observation Station for the second half of 1951.] *Wetter und Leben*, 4(1/2):29-30, Feb. 1952. DWB—Short review of weather conditions and their influence on vegetation. A rainy July with low temperatures, a very dry end of August and beginning of Sept. determined the conditions of vegetables, e.g., many sowings of oats at that time were destroyed. In conclusion, the characteristics of the harvest for various cultivated crops are given. *Subject Headings*: 1. Phenological observations 2. Petzenkirchen, Austria.—N.T.Z.

10N-156

551.506.8(4377)

*Kurpelová, Margita, *O fenologických pomeroch v jarnom období 1958*. [Phenological conditions in the spring of 1958.] *Meteorologické Zprávy*, Prague, 11(6):137-141, 1958. 4 figs., 2 tables, 12 refs. Russian and German summaries p. 137. DWB, DLC—Dates of the phenological phases of 12 plants are presented for 10 locations in Slovakia (Feb.-May 1956), and compared with long period (1926-1950) average dates. The data are found to reflect the weather development during the spring of 1958, which was cold at first and very warm and dry afterwards. *Subject Headings*: 1. Phenological data 2. Slovakia.—G.T.

10N-157

551.506.8:581.54(43)

Kurpelová, M., *Druhé kvitnutie rastlín v roku 1957*. [Second flowering of plants in 1957.] *Meteorologické Zprávy*, Prague, 11(2):51-52, 1958. 4 refs. DLC—Second flowering of several plants in the fall of 1957 was observed extensively in Czechoslovakia, following a very cool June, excessive precipitation in July, extremely variable weather conditions in July and Aug., and an unusual amount of solar radiation in Oct. Similar weather conditions prevailed in 1948, when plants also produced flowers for a second time. *Subject Headings*: 1. Plant phenology 2. Second flowering of plants 3. Czechoslovakia.—G.T.

10N-158

551.506.8(499)

*Lardinois, Emile, *Observations phénologiques à Uccle au cours de l'année 1959*. [Phenological observations at Uccle during 1959.] *Ciel et Terre*, Brussels, 76(3/4):128-132, March/April 1960. 5 tables. DWB, DLC—The author gives a short summary of the weather at Uccle during the first three seasons of the year. For Uccle, he indicates the dates of the starting of blossoming for about fifty plants and also the divergence with regard to the normal date of flowering (during the period 1896-1958). For several other stations in central, eastern and southeastern Belgium, data included 12 plants. *Subject Headings*: 1. Phenological observations 2. Uccle, Belgium.—A.V.

10N-159

551.501.9:551.506.8(477)

Liakhova, A. G., *Fenologicheskaya rabota Stalingradskogo otdela Geograficheskogo obshchestva SSSR*. [Phenological work of the Stalingrad section of the U.S.S.R. Geographical Society.] *Geograficheskoe Obshchestvo, SSSR, Izvestia*, 90(5):495, Sept./Oct. 1958. DLC—The Stalingrad Section of the Geographical Society of the U.S.S.R. organized a voluntary phenological network in the Stalingrad Oblast. Observations were planned to begin in the spring of 1958. *Subject Headings*: 1. Phenological networks 2. U.S.S.R.—I.L.D.

10N-160

551.506.8 551.586:6

Moiseichik, V. A., *Agrometeorologicheskoe obosnovanie srokov seva ozimyykh kul'tur na lugo-vostoke Evropeiskoi territorii SSSR*. [Agroclimatic basis for the selection of dates of sowing winter crops in southeastern European USSR.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy*, 47(74):42-50, 1956. 9 tables, 5 refs. DLC—According to the author, the selection of winter crop sowing periods in southeastern European U.S.S.R. should be based, in case of normal moisture supply, on effective temperature sums of 300°C, in order to have a six-sprout clustering of the plant before cold weather (+5°C), when development of winter crops ceases. From calculations based on agro-meteorological observations during 10 yrs carried out by the author, he concludes that the best time for sowing winter crops in southwestern European U.S.S.R. is: 1) Aug. 20-30 for the forest-steppe zone; 2) Aug. 25-Sept. 5 for the right bank regions of the steppe zone; 3) Sept. 1-5 for the left bank regions of the steppe zone; 4) Sept. 10-15 for Stalingrad Oblast. *Subject Headings*: 1. Phenological observations 2. Winter crop sowing dates 3. Southeastern European U.S.S.R.—A.M.P.

10N-161

551.506.8(439)

Nagy, Zoltán Keöpeczi, *A magyar tájak tavaszodása—a nyár beköszöntéig*. [Progress of spring in the Hungarian countryside up to the arrival of summer.] *Földrajzi közlemények*, Budapest 79(2):137-150, 1955. 5 figs., 14 refs. Also: Mátyás, György, *Megjegyzések "A magyar táj"*

Vaszodása—a nyár beköszöntéig” c. cikkkel kapcsolatban. [Comments on the previous article.] *Ibid.*, 80(1):55–58, 1956. 3 refs. **DLC**—Phenological phases of five plants (snowdrop, violet, cherry, wild chestnut and lily) in Hungary are shown in maps and discussed in relation to spring weather development. The importance of phenological factors as indicators of local weather is stressed. **MÁNDY** in addition to other criticism, contends that meteorological information cannot be directly derived from phenological observations, the development of plants being influenced by too many factors other than weather. *Subject Headings:* 1. Phenological data 2. Hungary.—G.T.

10N-162

551.586:551.524:551.506.8:634.1

*Pál Tamsá, *Über die Ursachen der Zusammenhänge zwischen Temperaturgestaltung und Aufblühdaten von Obstgehölzen sowie über die Temperaturempfindlichkeit der Pflanzen.* [On the causes of the relation between temperature and blooming dates of fruit trees and on temperature sensitivity of plants.] *Der Züchter*, Berlin, 29(2):78–91, 1959. 4 figs., 8 tables, 30 refs. **DA**—Relation between temperature and blooming dates of different kinds of fruit trees is studied according to different theories and methods. The variation in theoretical phenological dates made it necessary to compare the different methods. The **HERBST-WEGER** formula in relation to apples and pears expresses the relationship between temperature and physiological processes of blooming, with such exactness that it is possible to make good predictions. Biological processes of plants in relation to the temperature are expressed by thermal reaction norms. For each biological period it is possible to determine the temperature liable to cause some damage. *Subject Headings:* 1. Fruit culture 2. Blooming processes 3. Phenological forecasting 4. Temperature effects on fruit trees.—A.V.

10N-163

551.506.8(437.1/2)

Pifflová, L., *Vymezení fenologických oblastí Čech a Moravy.* [Determination of the phenological regions of Bohemia and Moravia.] *Meteorologické Zprávy*, Prague, 11(3):74–79, 1958. 2 figs., 8 refs. Russian summary p. 74. **DWB**—A phenological chart of western Czechoslovakia (Bohemia and Moravia) is presented, and the method used in preparing it is explained in detail. It is essentially based upon deviations of the principal phenological phases from the arithmetic mean for the entire area. The map contains 4 phenological regions and 26 sub-regions. A similar chart had been prepared for the eastern part of Czechoslovakia (Slovakia). *Subject Headings:* 1. Phenological charts 2. Czechoslovakia.—G.T.

10N-164

551.506.8

Protserov, A. V., *Agrometeorologicheskie pokazateli, opredeliaushchie skorost' prokhozhdeniia nezrzhaznogo perioda voskovaia—polnaia spelost' kolosovykh khebov.* [Agrometeorological indicators, determining the length of the transition period from waxy to ripeness in spiked grains.] *Meteorologiya i Gidrologiya*, Leningrad, No. 1:35–40, Jan. 1956. 2 figs., 4 tables, 2 refs. **DWB, DLC**—The attainment of ripeness in spiked grains is a process of drying out of grain and stalk. In order to verify this concept the results of phenological observations were compared with those on the evaporation from a water surface, carried out at several stations in the U.S.S.R. with latitudes ranging from 42° to 55°N and within zones of moisture surplus and deficit. It is shown that the rate of evaporation can serve as a means of determining the date of onset of ripeness. For regions of surplus moisture the evaporation of 30 mm of water from a free surface, and for zones of moisture deficit, the evaporation of 35 mm are taken as criteria for determining the onset of the ripening date of spiked grains. Data are given on the total evaporation of water from an open surface during the waxy-ripeness phase of spiked grains, the duration of this interphase period, the total mean daily moisture deficits and rate of drying for different mean daily values of moisture deficit, the determination of dates of ripening of spring wheat at Barnaul in 1955 and on the comparison between calculated date of onset of ripeness of spiked grain and actual date. *Subject Headings:* 1. Phenological observations 2. Evaporation from water surfaces 3. Grain crops 4. U.S.S.R.—I.L.D.

10N-165

551.506.8(436)

*Rosenkranz, Friedrich, *Phänologische Übersicht über das Jahr 1952.* [Phenological survey of 1952.] *Austria. Zentralanstalt für Meteorologie und Geodynamik, Jahrbuch*, 1952, New Ser., 39:D1–D6, 1953. tables. **DWB**—Data from 100 stations tabulated *in extenso* for events. Long descriptive account. *Subject Headings:* 1. Phenological data 2. Austria.—M.R.

10N-166

551.506.8:551.521.31(443)

Sanson, J., *Radiation solaire et phénologie de la décennie 1948–1957.* [Solar radiation and phenology of the decennium 1948–1957.] *Bulletin des Engrais*, Paris, No. 409:130–131, July–Aug. 1958. 2 tables.—Mean seasonal values of global solar radiation in the Parisian region, and dates of flowering in this region for 12 plants are given. *Subject Headings:* 1. Solar radiation 2. Phenological data 3. Paris, France.—A.V.

10N-167

551.506.8:551.524:551.55

*Sanson, J. (*Dir. adjoint du S.M.M.A.*), *Températures de la biosphère et dates de floraison des végétaux*. [Temperatures of the biosphere and flowering dates of vegetation.] *La Météorologie*, Paris, Ser. 4, No. 36:453-456, Oct./Dec. 1954. 3 tables. DWB—A study of the relationship between mean monthly and seasonal (spring) temperatures of the biosphere at 3 levels (1.50 m above ground and 30 cm and 1 m deep) and the mean dates of flowering of coltsfoot, lilac, hornbeam, chestnut, blue elder and *robinia* was carried out in the Paris region for the period 1900-1949. The investigation showed that: 1) The mean yearly temperatures of the biosphere at 1.50 m level above ground and at 1 m depth have risen by 1°C during the 50 yrs, but the temperature of the 0.3 m level remained almost unchanged; 2) Every drop of temperature in the biosphere causes a delay of the flowering dates ostensibly proportional to the importance of the temperature drop, and vice versa, i.e., a temperature rise is followed by an advance of the flowering dates of almost all the plants studied. *Subject Headings*: 1. Phenological data 2. Temperature—flowering date relationship 3. Paris, France.—A.M.P.

10N-168

551.506.8:551.5:061.1(436)

Sauberer, F. (Vienna), *Über die Agrarmeteorologie und die Phänologie in Österreich*. [Climate agrometeorology and phenology in Austria.] *Wetter und Leben*, Vienna, 7(8/11):257-258, 1955. DLC—The Austrian phenological network is maintained by the Zentralanstalt für Meteorologie und Geodynamik. The observations are being carried out by agrometeorological and forest meteorological stations which are being advised by the Bioclimatological Section of the Zentralanstalt. The individuals responsible for the compilation of the phenological data, are listed and the cooperation of the phenological service with frost protection and plant protection services is pointed out. *Subject Headings*: 1. Agrometeorological services 2. Phenological services 3. Austria.—I.L.D.

10N-169

551.506.8

Schnelle, Fritz, *Alpenphänologie im Rahmen der Phänologie Europas*. [Alpine phenology within the framework of European phenology.] *Germany, Deutscher Wetterdienst, Bericht*, 8(54):56-59, 1959. 2 figs., 8 refs. German, English and French summaries p. 56. DWB, DLC—Phenological observations carried out previously in different countries, provide material for a survey of the phenological conditions of the Alps in the framework of European phenology. A network of International Phenological Gardens including some parts of the Alps as well, provides an opportunity to compare the phenological observations of the Alpine region with those of the neighboring countries. It is necessary, however, to adapt the previously completed general programs of phenological observations to the specific conditions of the Alps. *Subject Headings*: 1. Alpine phenology 2. Phenological observations.—Author's abstract.

10N-170

551.506.8(234.9)

*Shavliashvili, I. A., *V Lagodekhskom zapovednike*. [In the Lagodekh preserve.] *Privodnitsa*, Moscow, No. 10:127-128, Oct. 1958. DLC—The author presents a table of phenological data for different altitudinal belts in the Lagodekh preserve, which is situated on the slopes of the eastern Caucasus and extends over an altitude of 560-2000 m. The phenological indicators are beech, Georgian and Eastern oak, hornbeam and mountain maple. *Subject Headings*: 1. Phenological data 2. Eastern Caucasus, U.S.S.R.—I.L.D.

10N-171

551.506.8(058)(497.1)

Szilágyi, Tibor, *A jugoszláv fenológiai évkönyvek*. [The phenological yearbooks of Yugoslavia.] *Időjárás*, Budapest, 61(2):139-141, March/April 1957. French version p. 161-162. DLC—Phenological data in Yugoslavia (as in Poland) are published in separate yearbooks rather than along with the climatological data. The latest of the Yugoslav phenological yearbooks (up to 1953) are reviewed and some comparisons are made between phenological conditions in Yugoslavia and in Hungary. *Subject Headings*: 1. Phenological data 2. Phenological yearbooks 3. Yugoslavia.—G.T.

10N-172

551.506.8(47)

Vsesoiuznoe Geograficheskoe Obshchestvo SSR, *K meteorologam-nabliudateliam prirody*. [To the meteorologist, observer of nature.] *Meteorologiya i Gidrologiya*, Leningrad, No. 1:67, 1958. DWB, DLC—In the U.S.S.R. phenological observations for scientific geographical use are collected by members of the volunteer phenological network of the Geographical Society of the U.S.S.R. This network is a direct successor of the first network which was organized by A. T. Voëikov and operated within the Russian Geographical Society from 1885-1895, when it combined with the main network of D. N. Kaigorodov. The need for expanding phenological observations in the virgin lands of the northern Asiatic regions of the U.S.S.R. and in the Far East required numerous observers and the Geographical Society of the U.S.S.R. appeals to its members to maintain the traditions of

Voluntary phenological observation. *Subject Headings:* 1. Phenological observation 2. Observational networks 3. U.S.S.R.—I.L.D.

10N-173

551.506.8(492)

§Woudenberg, J. P. M. et al., *Het fenologisch onderzoek in de jaren 1954/1957*. [Phenological investigations during 1954-1957.] *Landbouwkundig Tijdschrift*, Wageningen, 70(7/8):619-636, July/Aug. 1958. 8 figs., 6 tables. DA—After an introduction by J. P. M. WOUDEBERG, a summary of the weather from 1954-1957 is presented. Temperature, radiation and raingraphs, tables giving phenological data over many years for a certain number of plants, also charts of isotherms from March-May 1954 to 1957 are given. Subjects treated include: 1) fruit trees (1954-1957); 2) feral plants and trees (1955-1956); 3) butterflies of passage (1953-1957); 4) birds of passage (1954-1957). *Subject Headings:* 1. Phenological data 2. Climatic data 3. Netherlands.—A.V.

PLANT ECOLOGY

10N-174

551.506.8:631.95

Mándy, György, *Ökológiai felvételezési módszerek és újabb kutatási eredmények*. [Methods of observation and recent results in ecology.] *Időjárás*, Budapest, 59(2):71-79, March/April 1955. 1 fig., table, 5 refs. Russian and German summaries p. 71. DWB—The author develops a new method of ecological observation which he calls "periodic growing rate measurement." Series of treatments of one species are started weekly or biweekly and increases in length of the plants for equal periods (weeks) are computed and compared. This method is particularly suited for investigating ecological requirements of cultured plants. *Subject Headings:* 1. Plant ecology 2. Phenometry.—*Transl. from author's abstract.*

10N-175

551.586:580(6)

Mangenot, Georges (*Science Faculty, Univ. of Paris*), *Les facteurs écologiques*. [Ecological factors.] (In: UNESCO, *Study of tropical vegetation: proceedings of the Kandy Symposium, Kandy, Ceylon, March 1956*. Paris, 1958. p. 199-203. English summary p. 201.) DWB (M86:580 U581st)—Composition of vegetation varies greatly in different parts of the world, but ecological factors express combinations, with relatively few variations, of elementary factors: temperature, humidity, light, and soil conditions. The study of the vegetation reveals a number of "homocies," i.e., similar types of combinations of flora. Similar homologous environments are found in Europe and in North America, in Mediterranean Africa or in California, or even in Australia, in the Amazon, in Indonesia or in equatorial Africa. But in each group of homologous regions, the floristic compositions vary greatly, according to the "homocies." In the intertropical regions the temperature factor is not the limiting factor; a tropical region may be defined as one in which it never freezes. In mountainous regions, temperature is evidently a limiting factor, and among other factors may be mentioned that of nebulosity. It appears that in intertropical plains or in regions with low mountains, humidity and the factor of human interference are the essential, determining factors. The other important factor is humidity both of the atmosphere and of the soil. The author emphasizes that environment should be defined in relation to its vegetation. *Subject Headings:* 1. Plant ecology 2. Tropical vegetation 3. Africa.—*Based on author's abstract.*

10N-176

551.586:580(66)

Mangenot, Georges (*Univ. of Paris*), *Les recherches sur la végétation dans les régions tropicales humides de l'Afrique occidentale*. [Research on the vegetation of the humid tropical areas of West Africa.] (In: UNESCO, *Study of tropical vegetation: proceedings of the Kandy Symposium, Kandy, Ceylon, March 1956*. Paris, 1958. p. 115-126. bibliog. p. 126 (13 refs.). English summary p. 125-126.) DWB (M86:580 U581st)—Whereas there is a wide measure of agreement on two clearly differentiated formations of swamp forests and mangrove, there is a wide difference of opinion on the forests of the plains and low tablelands. After briefly discussing the basic floristic research carried out on the Ivory Coast, the author describes attempts made to explain and interpret the vegetation, giving at the same time the methods adopted. Judging from the several qualitative and quantitative criteria, it is found that it is possible to determine the structure of communities and verify the homogeneity of the associations. Among the most important environmental factors in the humid tropics are humidity and light, for in these regions temperature is not a limiting factor. The paper ends with a few suggestions such as the intensification on a world wide scale of research on the distribution of vegetable species in the humid tropical zones. *Subject Headings:* 1. Tropical vegetation studies 2. West Africa.—*From author's abstract.*

10N-177

551.586 551.581:580(213)

†Nuttonson, M. Y., *Agricultural ecology in subtropical regions*. Prepared for presentation at the Symposium for Agronomists organized by the Israel Ministry of Agriculture with the participation

of the Food and Agriculture Organization of the United Nations, Rebovot, Israel, April 13-15, 1959. Wash., D. C., American Institute of Crop Ecology, 1959. 56 p. map, 69 refs. DWB (M86:58 N988ag), DLC (SB111.N8)—Crop ecology is defined as limiting itself to the study of farm crops and their environments, both natural and man made, with study focused on a variety or strain, instead of on a species. The author discusses the vegetation and major plant communities of the two most distinct climatic types found within the subtropical belts of the world: 1) the dry-summer or dry subtropical climate, and 2) the humid subtropical climate. The ecology of some farm crops is analyzed on the basis of certain factors of their environment: temperature, humidity, moisture, duration and intensity of light, diseases and insects, and soil. The close relationship of crop ecology to good crop production is examined. Emphasis is placed on the need for the establishment of teamwork between the various disciplines of the natural sciences, in an effort to assist in the solving of agricultural problems. *Subject Headings:* 1. Crop ecology 2. Agricultural ecology 3. Subtropical climates.—N.N.

PLANT PHYSIOLOGY, ANATOMY

10N-178

551.521.3:551.577.13:65

Freytag, H. E. and Kullmann, A., *Die stofflichen Veränderungen der abgestorbenen Wurzeln einiger Kulturpflanzen*. [The material changes of dead roots of some plants.] *Zeitschrift für Acker- und Pflanzenbau*, Berlin, 105(3):335-348, March 1958. 4 figs., 8 refs. DLC—After developing a general hypothesis on the connection between the course of light absorption and the relationships of the color active components in the humin fractions, the "humification curves" (a follow-up in time of the color active components in the nonacid precipitable and the acid precipitable fraction of the NaOH extract) were obtained for 3 root residues: lucerne, sheep's fescue and potato. The color active components of the fractions showed an active dynamic in their changes in concentration through time, as well as in respect to their changing light absorption. These temporal changes can be explained on the basis of the deduced working hypothesis, and so give an insight into the mechanism of further humin synthesis whereby the ultimate end of the humin producing substances manufactured from the root material by microbe action, can be understood. *Subject Headings:* 1. Light absorption—color active components in humin fractions relationships 2. Humification curves.—Authors' abstract.

10N-179

551.586:551.573:581.1

Kuiper, P. J. C. and Bierhuizen, J. F., *The effect of some environmental factors on the transpiration of plants under controlled conditions*. *Wageningen, Landbouwhoogeschool, Mededelingen* 58(11), 1958. 16 p. 8 figs., 3 tables, 11 refs. DLC—Experiments on transpiration of cut leaves of bean and tomato in potometers were performed under controlled conditions of light, temperature and relative humidity. It was proven that Fick's diffusion law can be applied to the transpiration of leaves. A linear relationship between transpiration rate and light intensity was observed. Within the range of light intensities of the experiment, obtained with fluorescent tubes, the light intensity affects the transpiration rate mainly by changing the stomatal diffusion resistance to water vapor, less than 14% being due to an increase in vapor pressure deficit, owing to the increase in leaf temperature under the influence of light. Experiments on transpiration of bean plants and rye were performed with plants in soil. The effect of soil moisture is great under high transpiration conditions and negligible under low transpiration conditions. It can be assumed that the water supply to the shoot affects transpiration, independent of the light intensity, by changing the water content of the leaf, and by changing the diffusion resistance of the leaf by an osmotic reaction of the stomata independent of the light sensitive stomatal mechanism. The outcome of our experiments is that the transpiration may be expressed by a formula. *Subject Headings:* 1. Climatic effects on transpiration of plants 2. Soil moisture effects on transpiration of plants 3. Transpiration—meteorological element relationships.—From authors' abstract.

10N-180

551.586:551.521.1:551.524:581.1

Rovira, A. D., *Root excretions in relation to the rhizosphere effect*. [Pt. 4]. *Influence of plant species, age of plant, light, temperature and calcium nutrition on exudation*. *Plant and Soil*, The Hague, 11(1):53-64, June 1959. 4 figs., 5 tables, 14 refs. DLC—The exudation of amino acids by the roots of tomato, subterranean clover, and phalaris growing in nutrient solution under different environmental conditions has been studied. The amounts and balance of amino acids exuded by the different plants differed, phalaris and tomato exceeding clover. Exudation was greater from the plants during the first two weeks of growth than in the second two week period. Light intensity had a marked effect on the exudation of amino acids by clover; the amounts of serine, glutamic acid and α -alanine in the exudate were less at the lower light intensities. In tomato root exudate aspartic acid, glutamic acid, phenylalanine and leucine decreased with decreasing light but serine and asparagine increased. Higher temperatures increased the amounts of amino acids exuded by

tomato and clover roots, the latter released large amounts of asparagine at the higher temperatures. The amounts of glutamic acid from both plants increased considerably with temperature. Calcium level and aeration had little effect on exudation but the presence of microorganisms influenced the concentration of amino acids in the solution surrounding tomato roots. *Subject Headings: 1. Root exudates 2. Amino acids in root exudates 3. Light effects on root exudates 4. Temperature effects on root exudates.—A.V.*

10N-181

551.501:551.573:581.11

*Taneda, Yukio (*Dept. of Agric., Siga Prefectural Univ.*), *Study of potential evapotranspiration*, Pt. 4. *Agricultural Engineering Society [of] Japan, Journal*, 27(1):1-6, May 1959. 4 figs., 13 tables, 5 refs. In Japanese; English summary p. 1.—The author continued the measurement of potential evapotranspiration of various crops from April, 1957-Sept. 30, 1958 by using such portable evapotranspirometers as shown in illustration, and obtained the evapotranspiration coefficients of some winter crops in 1956, and summer crops in 1957 and 1958. The results are shown in tables. The definition was made here that the evapotranspiration coefficients M are expressed by the potential evapotranspiration from crops in the growing season. In this case, however, that of the mix-seeded pasture of orchard grass and red clover is taken as a standard value. As the result of experiments on the relation between soil texture and potential evapotranspiration (PE) with a lysimeter, it was not considered that the potential evapotranspiration varied with the physical properties of soil. Soil tank A of the lysimeter was of clay soil and bare. The orchard and red clover were replanted in tanks B (clay), C (loam) and D (sandy) on May 9, 1958, and potential evapotranspiration was measured, the results of which are shown. The rainfall in Dec. 1956 was 5.5 mm, which was very little as compared with 58.2 mm in an ordinary year, and the winter barley was damaged considerably from a drought in the early period of growing season. The author made a survey of the yield of barley in soil tank No. 15 and in the neighboring field which had not been irrigated. As the result, the yield of barley in the soil tank is estimated as 12% larger than the non-irrigated one. The experimental study of evapotranspiration, begun by the suggestion of the paper regarding potential evapotranspiration by V. W. THORNTHWAITE, closes with this fourth report. In order to develop the problems of evapotranspiration into the sphere of soil conservation, field irrigation and runoff, the mechanism by which rainfall infiltrates, percolates and holds itself in the soil should be studied. From now on the author is going to develop his study along these lines. *Subject Heading: 1. Potential evapotranspiration measurement techniques.—Author's abstract.*

GROWTH, HARVEST, YIELD

10N-182

551.586:581.14

Halperin, Jonas E., *Tailor-made weather on tap! What's new in crops & soils*, Madison, Wis., (5)2:18-19, Nov. 1952. 13 figs. DA—Earhart Plans Laboratory studies the influence of various climatic factors on plant development and this work is described. The \$407,000 laboratory equipped to study the effects of weather on plant life, still lacks control of one factor influencing plant growth: cosmic radiation night temperature is as important for plant growth as are daylight conditions of light and temperature. The Laboratory is operated by the California Institute of Technology, Pasadena, Calif. *Subject Heading: 1. Climatic effects on plant life.—O.T.*

10N-183

551.586:581.54:634.711

Hudson, J. P. (*Univ. of Nottingham, Sutton, Bonington*), *Effects of weather on plant behaviour*. *Nature*, London, 182(4646):1337-1340, Nov. 15, 1958. 6 figs. (incl. photos), table, 6 refs. DWB—Crop yields are affected by weather and the behavior of plants is influenced by environmental factors. The possibilities of controlling these factors in crop production have been discussed with particular reference to the raspberry plant. *Subject Headings: 1. Weather effects on plants 2. Crop yields 3. Climate control 4. Raspberries.—N.N.*

EFFECT OF CLIMATE AND ITS ELEMENTS ON PLANTS

CLIMATIC EFFECTS (GENERAL)

10N-184

551.586:551.506.8:581.05

Bider, M., *Beziehungen zwischen Witterung und Pflanzenwachstum*. [Influence of weather conditions on growing plants.] *Forschung und Technik*, Basel, No. 161 and 173, April 1958. 2 p.—A general review of meteorological influences on ecology of cultivated plants and on research methods in use. The author shows that influence of meteorological factors varies according to the climate of the region, the kind of vegetation and its state of development. Two principal methods are treated in detail: statistical research, and phenology. The paper ends with some considerations about the

influence of weather on the development of parasites. *Subject Headings:* 1. Meteorological effects on plants 2. Statistical methods in agrometeorology 3. Phenological method.—A.V.

10N-185

551.586:586

*†Blaisdell, James P., *Seasonal development and yield of native plants on the upper Snake River plains and their relation to certain climatic factors.* U. S. Dept. of Agriculture, *Technical Bulletin* No. 1190, Nov. 1958. 68 p. 15 figs., 24 tables, 85 refs. DWB (M86:580 B635se)—This thorough investigation was presented in thesis form, University of Minnesota, and involved analysis of vegetation and climatic records over the period 1923–1954 at the U. S. Sheep Experiment Station near Dubois, Idaho. The correlative data are based on control of fenced in (to exclude livestock) areas of $\frac{1}{2}$, 2, 3, 10, and 80 acres of the grazing fields on the upper Snake River plains at 5,500 ft. Detailed tabulated data are presented along with diagrams, and the results are resolved into 19 conclusive points showing that: 1) Annual precipitation is the most, and mean temperature the least variable; 2) Precipitation and cloudiness tend to vary inversely with temperature. 3) Cause and effect shows phasic development of plants being largely controlled by temperature and varied by available moisture. 4) Precipitation, more than temperature, controls herbage production; the slight beneficial effect of cloudiness and the adverse effect of wind are linked to moisture. *Subject Headings:* 1. Plant phenology 2. Climatic effects on plant life.—W.N.

10N-186

551.586:581.5:634.1

de Philippis, A. (Italy), *Phytoclimatology and silviculture.* *International Journal of Bioclimatology and Biometeorology*, Leiden, Netherlands, Vol. 2, (Pt. 2), 1958. 6 p. DWB—The study of phytoclimatology is divided into two phases: analytic, which deals with the effect of individual climatic factors on each expression of plant life; and synthetic which involves the application of phytoclimatology in the interpretation of the physiognomical and distributional phenomena of plants. The field of phytoclimatological classification which for large areas involves the process of induction, includes two phases: (1) quality and extent of climatic typology and (2) numerical values and geographic limits of the accepted types. The study of the latter is by means of thermal, pluviometric, humidity, sunshine and photoperiodic data. A review is presented of the various attempts made by investigators since A. DE CANDALLE (1855) to establish specific quantitative relationships between the climatic factors and vegetation phenomena; of various phytoclimatic classifications based upon vegetation; and of the distribution of vegetation as a function of climatic factors. The names of the various investigators associated with particular aspects of phytoclimatic research and classification are cited. The role of phytoclimatology in forest ecology is discussed. *Subject Headings:* 1. Phytoclimatology 2. Forest ecology.—I.L.D.

10N-187

551.586:63:551.510.42:581.1

Primault, B., *En marge des futures auto-routes.* [Along highways of the future.] *Schweizerische Zeitschrift für Forstwesen*, Bern, 109(1):37–43, Jan. 1958. 2 figs., 6 refs. DA—Some observations made on trees along highways, showing a high degree of probability of fatal influence on plants of air polluted by exhaust gases, especially by lead bromide. Meteorological factors influencing the distribution of these gases are discussed. *Subject Headings:* 1. Atmospheric pollution effects on plants.—A.V.

10N-188

551.521.16:535.2:577.

Trumble, H. C. (Adelaide U., Waite Agri. Res. Inst.), *Climatic factors and the nutrition of herbage plants.* (In: Specialist Conference on Plant and Animal Nutrition in Relation to Soil and Climatic Factors, Melbourne, 1949, *Proceedings*, pub. 1951, p. 1–9. ref.) DWB—In this general review the author summarizes the effect of seasonal climatic changes and of different climatic types upon the chemical composition of crop and herbage plants; the dependence of deficiency symptoms on climate; methodological difficulties in the measurement of natural climatic conditions; statistical analysis by partial correlation and regression of the relationship between plant characteristics and climatic variables; the role of soil and air temperature; thermoperiodicity; photoperiodism; gain and losses of soil moisture; evapotranspiration; moisture stresses within the plant; determination of soil moisture states; the measurement of climatic variables; and a criticism of the meteorological data currently recorded, and suggestions for their improvement. *Subject Headings:* 1. Climatic effects on plant nutrition 2. Plant characteristics—climatic variables relationships.—I.L.D.

PHOTOPERIODISM, PHOTOSYNTHESIS, RADIATION

10N-189

551.521.16:581.1

Bark, L. D. (Climatological Services Div., U. S. W. B.), *Plant response to length of day.* U. S. Weather Bureau, *Weekly Weather and Crop Bulletin*, 42(40):7–8, May 16, 1955. tables, figs., 3 refs.

WB—The response of plants to the relative length of day and night called photoperiodism is one of the most notable reactions of plants to their environment. Three broad photoperiodic classes of plants (with respect to their behavior) have been set up. This classification into short-day, long-day, and indeterminate plants has been made by growing a number of plants under a series of day lengths ranging from 3–24 hrs. This phenomenon of photoperiodicity can be followed in nature by observing the seasons of the year in which plants flower. The geographical distribution of plants is also limited by photoperiodism: long-day plants will also flower when subjected to short periods of light, provided these are combined with short dark periods to make alternating cycles shorter than the normal 24-hr day. The principles of photoperiodism are now applied by florists to insure a ready supply of greenhouse flowers. *Subject Heading: 1. Photoperiodism of plants.*—A.M.P.

10N-190

546.264:535.2:577.1 551.510.41

Decker, John P. (*Rocky Mountain Forest & Range Experiment Station*), **Further evidence of increased carbon dioxide production accompanying photosynthesis.** *Journal of Solar Energy Science and Engineering*, Phoenix, Ariz., 1(1):30–33, Jan. 1957. 4 figs., table, 5 refs. **DWB**—Photosynthesis in tobacco and 8 other plant species was measured at varied illumination and CO_2 concentration. Measurements were made with an infrared gas analyzer in a closed recycling system. Curves of apparent photosynthesis vs. light intensity and of apparent photosynthesis vs. CO_2 concentration can be interpreted as demonstrating that CO_2 production was greater during photosynthesis than in the dark. *Subject Headings: 1. Carbon dioxide production 2. Photosynthesis 3. Light intensity.*—*Author's abstract.*

10N-191

551.521.16:551.576:633

de Wit, C. T. (*Inst. for Biological and Chemical Research on Field Crops and Herbage, Wageningen, Netherlands*), **Potential photosynthesis of crop surfaces.** *Netherlands Journal of Agricultural Science*, Wageningen, 7(2):141–149, May 1959. 4 figs., 2 tables, 10 refs., 4 eqs. **DA**—A formula is arrived at for the calculation of the photosynthesis of a closed crop surface, its being assumed that the leaves of a crop surface are arranged without any preference as to direction, and that the photosynthesis curve of single leaves may be represented by a simple Blackman curve. The course of photosynthesis during the day is calculated by means of this formula. The potential photosynthesis of a crop surface in the Netherlands appears to vary from about 290 kg $\text{CH}_2\text{O ha}^{-1} \text{ day}^{-1}$ in June to about 50 kg $\text{ha}^{-1} \text{ day}^{-1}$ in Dec. Actual photosynthesis is lower because dissimilation has to be subtracted; a closed crop surface assimilating at its full leaf capacity is not obtained in many cases; translocation of sugars may be a limiting factor, and the carbon dioxide content of the atmosphere may be less than the normal 0.03%. *Subject Headings: 1. Crop surfaces 2. Photosynthesis 3. Netherlands.*—*Author's abstract.*

10N-192

551.586:551.521.1:633.16

*Kamel, M. S. (*Laboratory of Plant Physiological Research, Agricultural University, Wageningen, Netherlands*), **A physiological study of shading and density effects on the growth and the efficiency of solar energy conversion in some field crops.** *Wageningen. Landbouwhoogeschool, Mededelingen*, 59(5), 1959. 101 p.+ 3 plates, 50 figs., 16 tables, 72 refs. **DLC**—An experimental study is presented of the effect of shading and plant density on growth and efficiency of solar energy conversion in barley, and on the effect of density on efficiency of solar energy in mangold. The experiments were carried out at successive intervals under field conditions at Wageningen, during the 1957 and 1958 growing seasons. Four light treatments: 100% (full daylight), 80%, 50% and 25%, and three densities: 500 plants/ m^2 , 250 plants/ m^2 (normal density) and 125 plants/ m^2 were applied in barley. Two densities were applied in mangold: 25 plants/ m^2 and 8.3 plants/ m^2 (normal). Effects of treatments on all growth stages, from planting to maturity are reported in tables and graphs, and discussed. Growth was greatly affected by reduction of the light intensity and the response of the plants to shading with time were well reflected in their efficiency as converters of solar radiation. Under normal field conditions, the efficiency of solar energy conversion was low during the early stages, while plants were still less active; the efficiency increased until the maximum was reached at the same time of maximum shoot and leaf number, growth rate, fresh weight and total leaf area; it reaches a minimum at the end of the season. Plants at the lower intensities, owing to extension of the growth period, exhibited the higher efficiency values during later stages. The average efficiency was found to decrease with reduction of light intensity, although the periodic efficiency increased with shading at the early and the late stages of growth. Average values ranging from 0.9% for full daylight intensity to 1.4% for the 25% light intensity were obtained. In barley, increasing the density up to 500 plants/ m^2 favored the production of dry matter and led to higher efficiency values only during the first stage of growth. Increase in the number up to the normal density induced higher final yield and average efficiency. In mangold, increasing the density up to 5 plants/ m^2 induced maximum yield and higher efficiency values per period during all intervals but the last one, and over the entire growing season. Finally the author concludes that the efficiency

of solar energy conversion following closely the age trend of growth, is not constant and does not depend on the stage of growth. *Subject Headings:* 1. Barley culture 2. Mangold 3. Shading effects on solar energy conversion 4. Plant density effects on solar energy conversion.—A.V.

10N-193

551.586:581.1

Kok, B. (*Agric. Univ., Wageningen*), *Enige voorbeelden van het gebruik van tracers in de fotosynthese-onderzoek*. [Some examples of the use of tracers in photosynthesis research.] *Landsbouwkundig Tijdschrift*, Wageningen, 70(Extra No.):334-343, May 1958. 7 figs., table, 7 refs. **DA**—Discussion of the progress made in the field of photosynthesis by application of radioactive tracers. Discoveries made by WOOD, WERKMAN, LIPMANN, BROWN, GOOD, the Berkeley Group and others are explained with examples. The article treats the assimilation of CO_2 ; the reversibility of the Krebs-cycle; the use of C^{14} and P^{32} in paper chromatography, which is demonstrated in the map of the Berkeley Group, showing the distribution of the diverse photosynthetic intermediate products; the role of radioactive P in the reduction of light energy; attempts with O^{18} to establish the source of oxygen released during photosynthesis; the metabolism of green plants in the dark, in intermediate light and in constant light. *Subject Heading:* 1. Photosynthesis research.—A.V.

10N-194

551.521.9:536.33:581.05

Nicolaisen, W. and Buntrock, H., *Der Einfluss künstlicher Bestrahlung auf die Erwärmung der Pflanze*. [Influence of artificial radiation on the warming of plants.] *Die Gartenbauwissenschaft*, München, 22(4):246-271, 1957. 10 figs., 8 tables, 21 refs. **DA, DWB**—A good discussion of the warming of plants by artificial radiation. The authors give a detailed commentary on the workings of 5 different systems and the results on 3 different plants. *Subject Headings:* 1. Plant temperature 2. Artificial radiation effects on plants.—A.V.

10N-195

551.521.16:551.579.5:633.3

Petrov, A. P., *Otnoshenie k svetu i pochvennoi vlage rastenii travianogo pokrova dubrav*. [Relationship of grass cover plants of leafy forests to light and soil moisture.] *Akademiia Nauk SSSR, Doklady*, 97(1):169-171, July 1, 1954. 2 tables, 3 refs. **DLC**—The results of experiments in which grasses associated with leafy forests were either (1) subjected to full daylight illumination (2) placed under a cover of elm trees or (3) placed under a cover of trees sparser than the preceding are reported. The first two groups were associated with moisture conditions of 15, 58 and 90% of field capacity; the last group with moisture conditions of 15, 30, 45, 60, 75 and 95% of field capacity. The experimental results given in tables, indicate that the weight of plants growing under full illumination is greater than that of plants grown in the shade. Group 2 showed a difference in growth under different moisture conditions and Group 3 showed growth differences that varied with light and moisture. *Subject Headings:* 1. Forest grass cover 2. Illumination intensity effects on forest grass cover 3. Soil moisture effects on forest grass cover.—I.L.D.

10N-196

551.521.16:551.524.36:631.53

Rollin, Paul, *Action qualitative de la lumière sur la germination des graines de Phacelia tanacetifolia*. [The qualitative action of light on the germination of seeds of *Phacelia tanacetifolia*.] *Académie des Sciences, Paris, Comptes Rendus*, 247(18):1484-1487, Nov. 3, 1958. 2 figs., 4 refs. **DWB, DLC**—Study of the qualitative action of light in the germination of seed of *Phacelia tanacetifolia* accomplished by means of different light sources and various interferential filters in order to get, for each of the lights, an energy equal to 1000 ergs/cm²/s. The results of these experiments show that, contrary to what happens for the greater proportion of seeds, pale and deep red lights inhibit germination with a maximum activity for wave lengths equal respectively to 6600 and 7300 Å. The blue light (4000-4900 Å) causes an important lessening in the percentage of germination. Cold temperatures, ranging about 5°C, and gibberellic acid allow germination under light exposure provided certain conditions exist. *Subject Headings:* 1. Light effects on seed germination 2. Temperature effects on seed germination 3. Herbs.—A.V.

10N-197

551.586:551.521.16:633.3

Schmalz, H., *Der Einfluss alternierender Kurtztag- und Dauertag-Perioden verschiedener Länge auf die generative Entwicklung der Sojabohne und Kalanchoë blossfeldiana*. [Influence of alternating periods of different duration of short days and long days on the generative development of soybeans and *Kalanchoë blossfeldiana*.] *Die Naturwissenschaften*, Berlin, 46(6):212, March 1959. 2 tables, 3 refs. **DLC**—For the experiments, plants were placed in a well ventilated, dark greenhouse between 5 p.m. and 7 a.m. (short day); for long days, plants were placed under electric light (250 watts per m², distance between plants and electric light: 55 cm) between sunset and sunrise. A description is given of the different experiments and the development of the plants. *Subject Headings:* 1. Soybean cultivation 2. Kalanchoe 3. Daylight illumination effects on plants 4. Photoperiodism.—A.V.

10N-198

551.586:551.521.16:581.035.2

Smid-Wiersema, A. C. and van Dobben, W. H., **De betekenis van de basisbelichting voor de fotoperiodische reactie.** [The significance of the "basic" daylight exposition for photoperiodic reaction.] Wageningen. Instituut voor Biologisch en Scheikundig Onderzoek van Landbouwgewassen, Jaarboek 1957:51-55, 1958. 6 figs., ref. English summary p. 54. (Mededelingen, No. 12.) **DLC—B183.W2A25**—Plants were exposed to assimilatory daylight for a varying number of hours, the photoperiod being supplemented afterwards with artificial light up to 17 hrs. It appears that the duration of the basic daylight exposition limits the development of flowering of several crops (or varieties) to a different extent. This limitation must be distinguished clearly from limitations of a photoperiodic nature. There seems to be no interaction between the two kinds of limitation: a deficient "basic" daylight exposition delays the development of flowering, independent of the photoperiod. Yellow lupines appear practically day-neutral in respect to photoperiodism in the strict sense of the word. The differences obtained by weak, supplementary artificial light are significant. Development, however, can be delayed by limitation of the basic daylight exposition. This does not allow us to classify this crop as a long-day plant. **Subject Headings: 1. Photoperiodism** **Daylight duration effects on plants.—Authors' abstract.**

10N-199

551.586:551.521.16:581.14.035.2:633

van Dobben, W. H., **Het voor fotoperiodische inductie gevoelige stadium bij rogge, tarwe, zaanzaad, wikke en vlas.** [The photoperiodically responsive stage for rye, wheat, poppies, vetches and flax.] Wageningen. Instituut voor Biologisch en Scheikundig Onderzoek van Landbouwgewassen, Jaarboek 1957:57-64, 1958. 6 figs. English summary p. 64. (Mededelingen, No. 21.) **DLC—Wheat and rye are indifferent to photoperiodical treatment until the third leaf emerges. Poppies and flax show little reaction with regard to day length in the period when only the coleoptiles are developed. It is doubtful whether vetches (*Vicia sativa*) and peas have an indifferent stage after emergence. In these crops the coleoptiles do not emerge. The experiments were carried out in the open air with constant "basic" daylight exposition and supplementary artificial light to control the photoperiod. When a plant has been induced photoperiodically the flowering cannot be delayed by a short day in the shooting stage. This indicates that for long-day plants "short day" means only "absence of long day" and represents no active process. In comparison with the corresponding acceleration by long-day, short-day treatment in the beginning of the responsive stage gives a relatively small delay in generative development. Such a delay seems to be recovered more or less when the plant is replaced into long-day. This phenomenon may indicate that the induction acts stronger in large plants than in seedlings. An influence of temperature cannot be excluded. **Subject Headings: 1. Photoperiodism 2. Daylight duration effects on plants.—Author's abstract.****

10N-200

551.586:63

Wellensiek, S. J.; Doorenbos, J.; van Dobben, W. H. and Wiersma, J. H., **Symposium over De betekenis van de fotoperiodiciteit voor de praktijk van land-, tuin- en bosbouw.** [Symposium on "The significance of photoperiodicity for the practice of agriculture, horticulture and forestry."] Landbouwkundig Tijdschrift, Wageningen, 70(1):15-20, Jan. 1958. 3 figs. **DWB**—Summaries are presented of the four subjects treated at the Symposium, held on Oct. 23, 1957. S. J. WELLENSIEK developed some general ideas of photoperiodicity. J. DOORENBOS treated photoperiodicity in horticulture. The effect of long days and short days on several vegetables, fruit trees and flowers is reviewed. W. H. VAN DOBBEN dealt with the significance of photoperiodicity in agriculture and meadow land. He reviewed the effect of day length on wheat, rye, barley, peas, maize, grass, potatoes, etc. Finally, J. H. WIERSMA treated photoperiodicity in forestry. Here photoperiodicity can be applied only in the choice of ecological types and in giving a certain day length at a very early growth stadium. **Subject Headings: 1. Photoperiodicity 2. Netherlands.—A.V.**

10N-201

551.586:535.21:633

Zurzycki, J. (Lab. of Plant Physiol. Res., Agric. Univ., Wageningen), **Formative effects of various spectral regions of light on *Lemna Trisulca* L.** Wageningen. Landbouwhoogeschool, Mededelingen, 7(11), 1957. 14 pages, 10 figs., 9 refs. Summary p. 13-14.—Photomorphogenetic studies of the type carried out earlier in this laboratory, using large surface illumination in narrow spectral regions, were applied to sterile cultures of *Lemna trisulca* L. Three types of conditions were mainly used: 1) low light intensity spectral light applied to cultures containing sugar; 2) low light intensity spectral light applied as a day length extension to cultures receiving a basic high intensity light period in white light ("daylight" fluorescent tubes); 3) high light intensity spectral light applied exclusively, without white light or sugar addition. The morphogenetic characteristics studied were: the length/breadth relation of the leafy frond parts, and the relative length of the "petioles," expressed as two shape coefficients, "b/a," being length/breadth of leafy parts, and c/b, length of "petiole" over length

of "leaf." Condition 1 yields conspicuous elongating effects in near infrared; a slight elongating effect is observed in pure blue. Condition 2 yields much the same result, however less conspicuous differences, and no effect, or hardly any, in blue. Condition 3 yields elongation in red light and in red + infrared as was observed previously in some other plants (e.g. tomato). Interesting differences between the various spectral regions were also expressed in the number of daughter fronds per mother frond. Also the quotient of the percentage of the most frequent number of young fronds over the next in frequency, had an apparent relation to the spectral region, irrespective of the actual value of the numbers. *Subject Headings:* 1. Herbs 2. Light intensity spectral light effects on herbs —*Author's abstract.*

TEMPERATURE

10N-202

551.524:551.525:551.526

Jesser, E. (Vienna), *Erfahrungen mit der 14-Uhr Temperatur bei der Bodenschätzung Österreich.* [Experiments in the use of 2 p.m. temperature in soil evaluation in Austria.] *Wetter und Leben, Vienna*, 7(8/11):259-260, 1955. ref. **DLC**—The author reviews some of the literature indicating that noon temperature influences greatly the growth of plants. The use of means of 2 p.m. temperature for the period April-Aug. in evaluating the suitability of land for agriculture is discussed. *Subject Headings:* 1. Air-soil temperature relationships 2. Temperature effects on plant growth 3. Austria.—*I.L.D.*

10N-203

551.524:581.036.1:581.036.2

Molga, Marian, *O wpływie temperatury na procesy życiowe rośliny.* [The influence of temperature on the living processes of plants.] *Gazeta Obserwatora PIHM, Warsaw*, 4(12):4-7, Dec. 1951. **DWB**—An analysis of investigations concerning the influence of temperature on life processes in plants is presented. It shows the existence of thermal limits beyond which vegetative life ceases. Harmful effects of excessively high and low temperatures on plants (resistance ability to cold and heat, photosynthesis, etc.) are explained. Finally it is pointed out that in Poland where the temperature range of plant resistance is sufficiently great, most damage to plants is caused by temperature changes not in the plants themselves but in their environment (violation of equilibrium between ground and lowest air layer). *Subject Headings:* 1. Temperature effects on plants 2. Plant ecology 3. Poland.—*A.M.P.*

10N-204

551.586:633.1

†Schoorel, A. F., *De invloed van extreme temperaturen en van uitdroging op de kiemkracht van zaden.* [Influence of extreme temperatures and desiccation on the germinative power of seeds.] *Landbouwkundig Tijdschrift, Wageningen*, 70(2):117-122, Feb. 1958. 24 refs.—A résumé is given of previous investigations on the influence of extreme temperatures and desiccation on germinative power. The author points out that the axiom which says that seeds conserve better in dryness and at low temperatures, and less well in humidity and at high temperatures is not always true. He successively examines the influence of very low temperatures and the influence of high temperature on the germinative power. Likewise, he examines the influence of weather factors and humidity on seeds. *Subject Headings:* 1. Temperature effects on seed germination 2. Humidity effects on seed germination 3. Seed germination.—*A.V.*

10N-205

551.584:551.525/6:633.1

Takegami, S. (Kyusyu Agricultural Experiment Station), *Relations between the data of macroclimate and that of micro-climate in the field.* Pt. 1, Indication of daily course of temperature. *Journal of Agricultural Meteorology, Tokyo*, 7(3/4):90, Nov. 1952. 2 figs., 2 refs. In Japanese.—Comparative study of temperature data obtained in a paddy at 20 cm above the ground, and in an exposed location (Oct. 7-11, 1951). *Subject Headings:* 1. Rice paddy temperatures 2. Field microclimatology 3. Macroclimatology.—*G.T.*

10N-206

551.524.36:551.577.38:581.54.0

*Vasil'eva, N. G., *Vlianie vysokikh temperatur na kolloidno-khimicheskie svoistva protoplazmy rastenii.* [The influence of high temperatures on the colloidal-chemical properties of plant protoplasm.] *Akademiia Nauk SSSR, Doklady*, 88(2):341-344, 1953. table, 4 refs. **DLC**—Deals with harmful effect of drought on plants. Temperature effects on the permeability of protoplasm studied from 23-46°C for a number of agricultural plants. Measurement data are presented. Harmful effect start around 25°C, death point about 35°C depending on the kind of plant. At higher temperature the protoplasm cannot absorb more water, but rapidly loses it. *Subject Headings:* 1. Drought effects on plants 2. Heat effects on plant protoplasm.—*A. Assur.*

WIND

10N-207

551.311.3:551.577.38(78):633.11

*Ahnert, Frank, *Neue Winderosionsgefahr im Weizenanbaugebiet der Great Plains*. [New danger of wind erosion in the wheat growing area of the Great Plains.] *Erdkunde*, 9(3):217-220, 1955. 5 figs., 2 tables, 11 refs. English abstract p. 217. DWB—The "dust-bowl" of Kansas and neighboring states was in existence in the 1930's. After a rainy period in the 1940's renewed drought began in May 1952 and continued below the long-period normal (below 70% in many areas) throughout 1953 and 1954. Figures are given of areas seeded and harvested and wheat production in 1934, 1942-51, 1952, 1953 and 1954. March and April are the windiest months, when wind erosion is most serious though not irreparable. *Subject Headings*: 1. Soil erosion effects on wheat cultivation 2. Soil erosion 3. Midwestern United States.—C.E.P.B.

10N-208

551.556.4:551.311.3:631.4

Iakubov, T. F., *Kizucheniia vliianiia vetrovoi erozii na fizicheskie i khimicheskie svoistva pochvy*. [Influence of wind erosion on the physical and chemical properties of soils.] *Pochvovedenie*, Moscow, No. 5:41-47, May 1957. fig., 2 tables, 10 refs. English summary p. 47. DWB, DLC—The article deals with data concerning the study of chemical composition of eroded and noneroded sandy-loamy chernozems, sandy-loamy dark chestnut and sandy chestnut soils. The greatest changes in mechanical composition were found in eroded sandy-loamy chernozems and sandy-loamy dark chestnut soils, i.e. increased size of particles of the sand fraction, decreased total content of clay and silt particles. The changes of mechanical composition in eroded sandy soils are conditioned mainly by a particle redistribution in the sandy fraction, i.e. increase of the content of medium sand and decrease of the amount of fine sandy particles. A considerable decrease of the content of humus, nitrogen, phosphorus and potassium is found in eroded sandy-loamy chernozems and in a lesser degree compared with sandy-loamy chernozems, in sandy-loamy dark chestnut and sandy chestnut soils. *Subject Headings*: 1. Wind erosion effects on soil properties 2. Soil erosion 3. Soil mechanics 4. Soils.—Author's abstract.

10N-209

551.556.4:551.585.53:632.117

Shalvarov, K. A., *Vliianie vetropeschanogo potoka na nekotorye rasteniia pustyni*. [The effect of wind bearing sand on some desert plants.] *Priroda*, Moscow, No. 12:101-102, Dec. 1958. 2 photos. DLC—The author describes the desiccating and destructive effect of wind-bearing sand on various plants as observed at the Agricultural Experiment Station at Nebit-Dage (Turkmeny SSR). The 5-day mean wind velocity at 2 m above the ground was 16.3 m/s with an E-N-E direction; the relative humidity varied from 10-30% and the mean 5-day temperature was 29°C. The plant most resistant to desiccation was the local variety of bristle haired Tamarisk; because of its overall evaporating surface it was most resistant to desiccation. Jasmin and lilac suffered mechanical damage such as tearing or destruction of the leaves. Leaves of grafts of Bollara poplar shriveled and became colored as a result of burns. The Canadian poplar withstood best the effect of the sand wind; it showed fewer burns and torn leaves. The white acacia suffered greater injury to the leaves. The plants suffered from a lack of moisture. The burns of leaf tissue were produced by the penetration and concentration of sunlight by water drops and cellular fluids. *Subject Headings*: 1. Wind desiccation 2. Sand transport 3. Desert vegetation 4. Wind effects on vegetation.—I.L.D.

10N-210

551.586:551.556.4:633(438)

Ziennicki, St., *Masnahmen zur Bekämpfung der Bodenerosion in Polen*. [Protection against soil erosion in Poland.] *Die Deutsche Landwirtschaft*, Berlin, 9(3):129-134, March 1958. 2 figs., 3 photos, 6 refs. DLC, CU—Destruction of soil by erosion is relatively important in Poland. Erosion is greater in the hill regions, where the soil is rich and the climate more favorable for agriculture, than in the mountains. The hill regions are not higher than 200 m above sea level and are very suitable for cultivation of wheat and sugar beets. The author comments on the conditions of rain- and snowfall in both regions. A description of some measures of protection against erosion by water is given. *Subject Headings*: 1. Soil erosion 2. Soil erosion prevention 3. Soil erosion effects on agriculture 4. Poland.—A.V.

ATMOSPHERIC POLLUTION

10N-211

551.510.41:632.891:581.1

Hölte, W., *Zur Kenntnis von Wesen und Erscheinungsformen der Schwefligsäureeinwirkung auf die Pflanzenwelt*. [How to recognize the effects of SO₂ on vegetation.] *Zeitschrift für Pflanzenkrankheiten (Pflanzenpathologie) und Pflanzenschutz*, Stuttgart, 65(1):32-36, 1958. 13 refs. DA, DLC—The SO₂ in the air of industrial areas enters the plant through the stomata and affects

physiological processes in general. It interferes with photosynthesis, metabolism and the water balance of the cells, inhibits the activity of the iron of the chloroplasts and probably vitamin I. The microscopic changes of smoke injured cells are demonstrated. *Subject Headings: 1. Chemical composition of atmosphere 2. SO₂ effects on plants 3. Plant physiology.—Author's abstract.*

10N-212

551.510.41/2:638

†Thomas, Moyer D., *Air pollution with relation to agronomic crops*, Pt. 1, General status of research on the effects of air pollution on plants. *Agronomy Journal, Madison, Wisc.*, 50(9):545-555, Sept. 1958. 5 figs., 4 tables, 39 refs. Noble, Wilfred M. and Wright, Lloyd A.: Pt. 2, A bio-assay approach to the study of air pollution, p. 551-553. 4 figs. (photos), 9 refs. Cole, Gordon A.: Pt. 3, Vegetation survey methods in air pollution studies, p. 553-555. Taylor, O. C.: Pt. 4, Plant growth suppressed by exposure to air-borne oxidants (smog), p. 556-558. 3 figs. (photos), 3 tables, 9 refs. Richards, B. L.; Middleton, John T. and Hewitt, W. B.: Pt. 5, Oxidant stipple of grape, p. 559-566. 3 figs., 4 refs. Hill, A. C.; Transtrum, L. G.; Pack, M. R. and Winters, W. S.: Pt. 6, An investigation of the "hidden injury" theory of fluoride damage to plants, p. 562-565. 4 figs., (incl. photo), 2 tables, 15 refs. Hansen, E. Don; Wiebe, H. H. and Thorne, Wynne: Pt. 7, Fluoride uptake from soils, p. 565-568. 5 figs., table, 10 refs. DWB, DLC—These papers were presented at a symposium held at the 50th Anniversary meeting of the American Society of Agronomy, Nov. 20, 1957. Pt. 1 is a review of research, and summarizes those aspects of air pollution that are of major interest to agriculture. Effects on crops of sulfur dioxide, fluorine compounds and smog are discussed. Pts. 2-7 present discussions of different techniques developed in the use of vegetation as an index of air pollution and as an indicator of pollutant dispersion. Hidden injury [i.e. interference with growth or functioning of the plant, without the production of visible lesions] is investigated in relation to citrus, and forms Pt. 4. In the fifth paper, a new disease of grapes is described and attributed to air pollution. Pt. 6 reports that there is strong evidence that hidden injury to crops does not occur at the levels of gaseous fluoride that might be found in the atmosphere in the vicinity of modern industries. Pt. 7 discusses fluorine uptake from soils exposed to several years of air-borne fluorine contamination, contrasted with the amount of uptake from soils taken from an area of little or no contamination. *Subject Headings: 1. Atmospheric pollution effects on crops.—M.F.H.*

FROST AND FREEZE DAMAGE

10N-213

551.524.37:632.111:551.481(489)

Amstrup, Niels, *Kultiveringsproblemer på den tørlagte Søborg sø*. [Cultivation problems on the reclaimed Søborg Lake.] *Geografisk Tidsskrift, Copenhagen*, 54:24-35, 1955. 4 figs., 8 refs. DWB—Some physical and chemical conditions related to soil cultivation of reclaimed lakes in Denmark are discussed. Monthly weather records for the Søborg Lake, 1890-1911 show an average of 158 frost free days with first day of frost Oct. 11 and last May 4. Similar records from two other lakes show 143 and 146 frost free days with first frost Oct. 2 and 10, and last May 11 and 16 respectively. The frost susceptibility is due to the low elevation and the characteristic shape of the lakes which favor the local low temperatures caused by heavy radiation and stable air over the areas. *Subject Headings: 1. Frost danger 2. Reclaimed lakes 3. Denmark.—W.N.*

10N-214

551.524.37:634(52)

Ara, M., *Late-frost damage in Miyagi Prefecture on 3rd May 1951*. *Sendai, Japan. Central Meteorological Observatory, Bulletin of the Meteorological Society for Research of Tohoku District*, 6(1):63-66, Nov. 1951. 6 figs., table. In Japanese; English summary p. 252.—The author investigated damage to the leaves of mulberry, fruit trees and growing crops by late frost in May 1951. The results obtained indicate that the extent of such damage does not always agree with the distribution of minimum temperature. Damage is great on buds of early germination and vice versa. Area of damage is mainly in basins at the foot of mountains. The vertical distribution of damage indicates the height of damaging cold air to be about 20 m. *Subject Headings: 1. Frost damage to crops 2. Frost distribution 3. Miyagi Prefecture, Japan.—Author's abstract.*

10N-215

551.524.3

Bristow, G. C. (*Climatological Services Div., U. S. W. B., Wash., D. C.*), *Coming of winter*. *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 42(46):6, Nov. 14, 1955. DWB—Frosty wintry weather comes to the U. S. corn belt in November. Severe winter extends from the more northern states to southern Iowa. From Nov. until Jan., Minn., N. D., and other more northern states experience severe cold. Freezing weather avoids the southeasterly states. Three maps are included: they show isochrones of the first dates for normal mean, minimum and maximum temperatures of 32°F. *Subject Headings: 1. Freezing temperature dates 2. Central United States.—N.N.*

10N-216

551.524.372:632.111

Bouchet, R., *Aperçu sur les recherches, poursuivies en France à l'Institut National de la Recherche Agronomique dans le domaine des gelées de printemps*. [Survey of research on late frosts, carried out in France at the National Institute for Agronomic Research.] *Le Fruit Belge*, Liège, 26(200):57-61, April 1958. DA—Examination of the standard means of fighting frost (smoke production, heating, spraying) is made. In France, experiments were carried out on the freezing of plant tissues and the determination of resistance thresholds. It has been demonstrated that a dry flower is less sensitive than a wet flower. Studies are in progress concerning the problem of the delay in the opening of buds caused by hormonal treatment. Results are hopeful; delay in the opening of buds ranging to about 15 days has been observed. *Subject Headings*: 1. Frost protection methods 2. Hormonal treatments of flower buds 3. France.—A.V.

10N-217

551.524.37:632.931.1

Bouchet, R. (*Station Centrale de Bioclimatologie, Versailles*), *Essai de bilan économique effectué en Champagne sur la lutte contre les gelées au moyen de chauffeuses à mazout*. [Cost of experiment carried out in Champagne concerning frost protection by means of fuel oil burners.] *France, Ministère d'Agriculture, Bulletin Technique d'Information des Ingénieurs des Services Agricoles*, No. 135:609-612, Nov.-Dec. 1958. 2 tables. Among the methods of frost protection, the process of warming the atmosphere by means of burners appears to be one of the most efficacious and simple. In order to guide the arboriculturist in the choice of action, the author establishes the approximate cost of using burners. *Subject Heading*: 1. Frost protection methods.—A.V.

10N-218

634.8:551.584:632.11

Bouchet, R., *Etude microclimatique dans le vignoble aubois. Influence de certains facteurs locaux et cultureux sur l'aggravation du risque de gelée*. [Microclimatic study in the Aube wine region. Influence of certain local and cultural factors on the increase of frost risk.] *Académie d'Agriculture de France, Paris, Comptes rendus*, 43(4):200-205, Feb. 19, 1958. 3 figs. DLC—The late frosts are generally more severe in the Aube wine region. The object of this study is to examine the influence of the division into small holdings on the increase of frost risk. The experiments were carried out in two districts: Urville and Neuville-on-Seine. A topographic description of both regions and a survey of the vegetation surrounding the vineyard are given. The meteorological observations are given in the form of diagrams. The author shows the adverse effect of the division of the vineyards and points out once more the influence of slight topographic variations on the increase of frost risk. The grouping of the vineyards into larger areas should reduce the waste lands on the border and increase the number of vines. This should cause the addition of 1-2 degrees to the minimum temperatures, thus reducing by more than half the risk of frost. *Subject Headings*: 1. Late frosts 2. Frost protection of vineyards 3. Urville, France 4. Neuville-on-Seine, France.—A.V.

10N-219

551.524.37:634.3

Butson, Keith (*State Climatologist, Gainesville, Fla.*), *Some aspects of citrus and weather in Florida*. U. S. Weather Bureau, *Weekly Weather and Crop Bulletin*, 43(49):7-8, Dec. 3, 1956. 2 charts, 2 refs. DWB, DLC, DA—Air temperature during the winter and early spring constitutes one of the principal hazards to citrus production. Heat has to be supplied during cold nights. Below freezing temperatures are not always detrimental to citrus. Warm or cold weather is an index to the production cost assessment. *Subject Headings*: 1. Frost hazard 2. Citrus fruit 3. Florida.—N.N.

10N-220

551.524.37:632.111.5

Carney, C. B. (*Weather Bur. Airport Station, Raleigh, N. C.*), *Freeze damage to plants*. U. S. Weather Bureau, *Weekly Weather and Crop Bulletin*, 46(21):7-8, May 25, 1959. 7 refs. DWB, DLC—Subfreezing weather and the formation of ice crystals in plant tissues are injurious and killing to plants. For example, on March 26, 1955 the eastern parts of N. C. had afternoon temperatures in the 70's with a minimum well above freezing. A cold front moved southeastward and the strong, gusty northwesterly winds brought in cold air. This resulted in some \$6 million damage to agricultural plants. Reasons why some of the forment plants withstood the freezing and the very low temperatures are given. *Subject Headings*: 1. Freezing effects on plants 2. Plant damage 3. North Carolina.—N.N.

10N-221

551.524.371:632.111.5

de Zeeuw, J. W., *Mogelijkheden van nachtvorstwering*. [Ground frost prevention.] *Netherlands, Directie van den Landbouw, Mededelingen [van de] Directeur van de Tuinbouw*, 21(7):430-433, July 1958. fig. DLC—Important factors in connection with the occurrence of ground frost include: the atmospheric conditions (particularly the presence of water in droplets); the characteristics of the soil, with special emphasis on the heat conductivity; the presence of low growing crops and the type

of the landscape. Of the methods of ground frost control employed in the Netherlands, spray has to date been the only one which was really successful. Artificial mists do not as a rule sufficiently obstruct radiation, while the effect of both burners and wind machines is only small. Research work in this field is being energetically continued. *Subject Heading: 1. Ground frost prevention.—A.V.*

10N-222

551.524.371:632.111

Delbard, Georges, *Contrôle automatique des gelées de printemps par aspersion d'eau*. [Automatic protection against spring frosts through water sprinkling.] *Arboriculture Fruitière*, Paris, No. 47:8-9, Jan. 1958. 3 figs. DA—Transl. from *The Commercial Grower*, Nov. 8, 1957. Description of a successful method of late spring frost protection by means of automatic water sprinkling systems. Account is given of the results obtained from experiments made during the night of May 5-6, 1957, when minimum temperature was about -3°C . A mercury thermometer creates a contact at 0° and brings a relay into action which starts an electric motor operating the rotary pump which feeds the sprinklers with water coming from an adjoining river. *Subject Headings: 1. Late spring frosts 2. Frost protection methods.—A.V.*

10N-223

551.582(45) 551.586:633

Dona, Ferdinando, *Elementi per la climatologia di alcune zone pascolive del Trentino*. [Climatological elements of some pasturage zones of Trentino.] *Studi Trentini di Scienze Naturali*, 31(33):109-148, 1954. foot-refs., chart. Italian, German and English summaries p. 148. Reprinted at Padua. Università. Istituto di Geodesia e Geofisica, Pubblicazioni, New Series, No. 21. DWB—Fairly detailed temperature, rainfall, and snow data are presented for 38 thermometric stations, 12 precipitation stations and a number of snow measurement stations between 1000 and 2000 m above sea level in the Trentino Alto Adige and Prealpi Venete region of Italy in order to determine conditions in 18 separate pasturage areas located, as shown on map, near or in between the meteorological stations. Each of the 18 regions is taken up separately with regard to temperature, precipitation, snow data used and general climatic and topographic conditions. *Subject Headings: 1. Climate of pasture areas 2. Climate of Trentino, Italy 3. Trentino, Italy.—M.R.*

10N-224

551.524.37:632.111.5(747)

*Frederick, Ralph H.; Johnson, Ernest C. (both, U. S. W. B., Albany, N. Y.) and MacDonald, H. A. (Cornell Univ.), *Spring and fall freezing temperatures in New York State*. Cornell University, N. Y. State College of Agriculture, Cornell Miscellaneous Bulletin, No. 33, Aug. 1959. 15 p. maps, tables. DWB (M24.37 N532sp)—In New York State, the number of days between the spring and fall freezes, in many instances, determines the economic feasibility of growing certain crops. The degree of injury suffered by a plant as a result of low temperatures, depends upon a number of factors including the species and variety of the plant, the part of the plant that is injured, rate and duration of cooling, "hardening" caused by several periods of cool temperature, and dry matter content of the plant. The presence of cool dry air, clear skies and light or calm winds are primary requisites for late spring or early fall freezes. Procedures which can be used to protect crops from freezing are discussed. Data for 79 stations are given, including date of last 32°F temperature in spring, first 32°F temperature in fall, mean date last spring minimum, and mean date first fall minimum. *Subject Headings: 1. Freezing temperatures 2. Freezing temperature dates 3. Plant freezing 4. New York State.—M.F.H.*

10N-225

551.524.37:633 551.515:633

Fukuoka District, Japan. Central Meteorological Observatory, *On the date of occurrence of agricultural damage in Fukuoka Prefecture*. *Journal of Agricultural Meteorology*, Tokyo, 12(3):108-110, Jan. 1957. fig. In Japanese. DWB—A single chart based on data from the period 1890-1954 shows daily intensity frequency of typhoons, heavy rainfalls, storms, air temperature, wind speed, amount of cloud, duration of solar radiation, and humidity. The dates of occurrence of damage are as follows: 1) late frosts: April 6, 16-17, 23, 29, May 4; 2) typhoons: June 5, 23, July 19, 2, (most frequent), Aug. 13-28 (most frequent), Sept. 6-17 (most frequent), Oct. 16; 3) heavy rains: June 5, 23, July 24, Aug. 18, 26; and 4) storms: Jan. 15, 22, March 8, 23, April 19, Aug. 18, 25, Sept. 15, 19, 23, Nov. 26, Dec. 7, 16. *Subject Headings: 1. Frost damage to crops 2. Typhoon damage to crops 3. Storm damage to crops 4. Storm frequency data 5. Long period records 6. Fukuoka Prefecture, Japan.—Jay Woo.*

10N-226

551.524.31:551.524.4 551.586:634.1

Fukushima, Japan. Weather Station, *On the nocturnal temperature variation surrounding the orchards on a frosty night*, Pt. 1. Japan. Central Meteorological Observatory, Tokyo, *Memoir of Industrial Meteorology*, 19(1):19-30, Dec. 1955. 9 figs., table. In Japanese; English summary p. 29-30. Pt. 2, *Ibid.*, 19(2):91-99, March 1956. 7+ figs. In Japanese; English summary p. 98-99.

LC—In order to prevent frost damage, investigations were made on the process of nocturnal temperature variation and the temperature distribution in and near the pear orchards of the Matsukawa sector, Fukushima Prefecture, during the frosty night April 6-7, 1955. Figures represent the distribution of the occurrence of the time of freezing temperature, duration of freezing temperature, danger index, distribution of minimum air temperature, etc. It is found that where the minimum temperature is low, the beginning time of dangerous temperature is earlier and its duration longer. There are two "warm zones": a belt at about 200-400 m above sea level and a zone extending southeasterly from the focus of Matsukawa sector. Around these zones exists a zone of severe coldness. The forming process of nocturnal cold air outflow is shown. Air films near the ground on the top of hills grow cold as the nocturnal cooling progresses, flow out to lower places intermittently, and then form a cold pool. The period of this cold air outflow is about 95 min. A greater part of the quantity of temperature fall owing to nocturnal cooling is determined by the degree of the fall during a few hours after sunset. Investigating wind-temperature relationships revealed that in general, low wind velocities correspond to high nocturnal cooling degrees. *Subject Headings:* 1. Nocturnal temperature profiles 2. Nocturnal cooling 3. Minimum temperature distribution 4. Frost danger 5. Pear orchards 6. Fukushima Prefecture, Japan.—A.V.

10N-227

551.524.37 551.524.371:061.3

Gerber, H., *Probleme der Spätfrostbekämpfung*. [Problems of late frost control.] Reprint from *Schweizerische Zeitschrift für Obst und Weinbau*, Wädenswil, No. 25, Dec. 7, 1957. 4 p. **DLC**—Report of the three country (Switzerland, Germany, France) conference on agricultural meteorology held in Bottmingen near Basle on Oct. 30, 1957. Summaries are presented of various papers delivered at the conference. W. KÜHN discussed the meteorological factors that produced the spring frosts in 1957 in Switzerland. Radiation frosts which are most common in Switzerland and advection frosts are described. The lowest April minimum temperatures measured at 50 cm above the ground were recorded on April 14 and 15, 1957 at Vétroz (Wallis), namely, 10.5°C on the same day the temperature fell below -6°C at Benken (Basle) and Flaach (Zurich). K. WITTS discussed protection against frost by sprinkling at different temperatures and sprinkling densities and rates. Further papers are cited on the results of measures of late frost control in Nals (Southern Tyrol) by BIDER and MEYER, on heating methods by H. N. AICHELE, etc. *Subject Headings:* 1. Late spring frosts 2. Frost protection.—I.L.D.

10N-228

551.524.37:551.509.612

*Godard, M. and Nigond, J. (*Inst. Nat. de la Recherche Agron.*), *Les gelées de printemps à l'Ecole Nationale d'Agriculture de Montpellier*. [Spring frosts at the National School of Agriculture, Montpellier.] *La Météorologie*, Paris, Ser. 4, No. 36:319-344, Oct./Dec. 1954. 5 figs., 10 tables, 5 refs. French, English and Italian summaries p. 319. **DWB**—Results of a detailed study of observational data concerning the air temperature and actinothermic indications (according to BRAZIER) carried out in the spring during 43 yrs (1884-1928) at the Montpellier school are utilized in the calculation of frequency, duration and time of onset of frosts according to their intensity. In order to determine the efficiency of frost preventive measures the author studies the comparative danger of frost damage by examining the harm caused by frost on bare ground, grassland, freshly plowed land and ground covered with vegetation. It is shown that only about $\frac{1}{4}$ part of dangerous frosts could be made harmless by existing preventive measures, whereas the rapidly decreasing frequency of frosts with the advance of spring shows that primary concern should be given to the development of methods tending to retard the early budding of the plants, to good cultivation and to a removal of the vines from lowlands to slopes, away from meadows. Many tables and graphs are included. *Subject Headings:* 1. Frost data 2. Frost prevention 3. Frost frequencies 4. Montpellier, France.—A.M.P.

10N-229

551.586:551.524.36:634.11:632.111

Karnatz, H., *Untersuchungen über Frostresistenz der Obstgehölze im Baumschulstadium*. Investigation on frost resistance of fruit trees in nursery stadium.] *Der Züchter*, Berlin, 28(7):323-328, 1958. 11 tables, 8 refs. **DA**—During the winter 1956/57 (Nov.-March) experiments have been carried out on the effect of low temperatures on young apple trees. Some varieties showed damage in Nov.-Dec., whereas other trees were damaged in midwinter. The author describes the material and methods used and comments on the different results. *Subject Headings:* 1. Apple trees 2. Frost resistance of apple trees 3. Frost damage to apple trees.—A.V.

10N-230

551.524.37

Maeda, H., *On the late frost in the Reinan Region, Fukui Prefecture*. [Pt. 1.] *Japan. Meteorological Agency, Tokyo, Memoirs of Industrial Meteorology*, 20(1):47-49, Oct. 1956. figs., tables. In Japanese; English summary p. 49. **DLC**. (For Pt. 2, see 11.3-107, MAB.)—In the present paper, the author investigates the relationship between late frost and agriculture in the

Reinan Region, southwestern part of Fukui Prefecture. The main agricultural products of the region are mulberry leaves, tobacco and potatoes. The late frost damage in this region begins mainly in the last decade of March and threatens all through April. As the first step of investigation the author classifies the weather charts and has obtained six results, as follows: Type A, A migratory anticyclone has its center over the region; Type B, A migratory anticyclone is located to the west of the region; Type C, A migratory anticyclone is located to the east of the region; Type D, A anticyclone extends from the north of the region or from the Sea of Okhotsk; Type E, An anticyclone is located to the south of the region, or this part is covered by a high pressure belt; Type F, The case is not included in Types A-E. For future research the author wishes, by using the observational data of Tsuruga Weather Station on the coast of Tsuruga Bay, to examine the relation of the coastal observations to the meteorological elements of inland areas suffering from frost, and to establish a forecasting method of late frost. *Subject Headings:* 1. Late frosts 2. Fukui Prefecture, Japan —*Author's abstract.*

10N-231

551.506.8:551.524.37:632.1111

Misawa, H., On the role of plant phenological observations in late frost protection. *Journal of Agricultural Meteorology*, Tokyo, 11(4):136, March 1956. 5 refs. In Japanese. DWB—It is particularly important that from late autumn to early spring the formation of a cold air mass and its passage should be thoroughly investigated, because it offers information very necessary in the forecasting of frost damage. A theory concerning the lingering snow affects the interpretation of phenological observations. *Subject Headings:* 1. Forecasting frost damage 2. Phenological observations 3. Frost protection of plants.—K.C.

10N-232

551.524.37:632.1111

Mitosek, Henryk, Przyszłość wiosenne 1951 roku w okolicy Puław i szkody przez nie wyrządzone. [Late frosts in spring 1951 and damage inflicted in the environs of Puławy.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 6(1/2):61-70, 1953. fig., 6 tables, ref. English summary, p. 70. DWB—One of the characteristic features of the climate of Poland is the appearance of late spring and early autumn frosts which have a detrimental effect on vegetation, especially if they occur in the growing season. The usual time for appearance of such frosts is between the end of March and May 23 in the spring and Sept. 20 and Nov. 11 in the fall. But in 1951 during the month of May and June the air temperature dropped below zero 6 times at the stations, and 12 times in forest 3 km distant. The first autumn frost occurred on Sept. 10. Tables show the minimum temperatures of these succeeding frosts at different heights above the ground. Author describes and analyzes the damage inflicted by the frosts. *Subject Headings:* 1. Frost damage to plants 2. Puławy, Poland.—A.M.P.

10N-233

551.524.37:632.1111

Mullett, Clarence C., (District Horticulture Agent, Traverse City, Mich.), Wind machines. *American Fruit Grower*, Willoughby, Ohio, 78(3):46-50, March 1958. 2 figs. DWB—Farm tractor powered helicopter rotor blades mounted on towers were successfully operated in 1957 in several orchards, except during high wind frost situations. The cost of a unit was \$2000-\$3000 as opposed to \$6000 for commercial units providing their own power. *Subject Heading:* 1. Frost fans.—G.T.

10N-234

551.524.37

Nagy, Lajos and Szabó, Bálint, Fagyváltakozások Debrecenben. [Frost alternation in Debrecen.] *Időjárás*, Budapest, 59(5):309-311, Sept./Oct. 1955. 3 figs., 2 tables, eqs. DLC—B frost alternation is meant a transition from freezing to nonfreezing or from nonfreezing to freezing temperature. Such alternations cause structural changes in the soil; they are harmful to winter seeds. Data on monthly average number of frost alternations and days with frost alternation at Debrecen are presented for the period 1929-1943. The measurements were made 2 m above ground at ground level and at 5, 15, 25 and 50 cm depth. The number of alternations is largest at the surface and decreases with depth. Correlations are computed between frost alternations at the surface and at 2 m above ground, and between number of alternations at 0, 5 and 15 cm below ground and (a) number of days with snow cover and (b) snow cover thickness. *Subject Headings:* 1. Frost alternations 2. Debrecen, Hungary.—G.T.

10N-235

551.524.371:634(494.44

Nicollier, J., Les gelées de printemps dans le Valais central et leur apparition en 1957. [Spring frost in Central Valais and its appearance in 1957.] *Murithienne*, Sion, 74:54-68, 1958. figs., 3 tables. DLC, DA—Physiological effects of frost. Critical temperatures in vegetation development, plant variety and frost duration are presented. Synoptic and local meteorological causes (advection, radiation, evaporation) are discussed. As advective frost, the author describes the frost caused by local cold air flow. Influence of the ground conditions (ploughed soil, grass, etc.) is

known. Some information about frost in April and May 1957 in Central Valais is given. Struggle against frost by fires, irrigation and covering of the plants is described. *Subject Headings:* 1. Late spring frosts 2. Frost effects on plants 3. Frost protection methods 4. Central Valais, Switzerland. —A.V.

10N-236

551.525.2:631.436.6

Scharringa, M., *Nachtvorst, bodem en begroeiing*. [Ground frost, soil and vegetation.] Netherlands. *Directie van den Landbouw, Mededelingen [van de] Directeur van de Tuinbouw*, 21(6): 34-349, June 1958. 5 refs. **DLC**—Ground frost occurs if the heat balance of the earth's surface is negative. This heat balance is partly determined by the state of the atmosphere, partly by the physical characteristics of the soil and vegetation, if any. For fruit growing it is important to know how the pore volume and the moisture content of the soil influence the temperature at some height above the surface. Vegetation, such as a grass cover, forms a layer in which the thermal conductivity is considerably reduced. So its influence on the night temperature is important. Research into the fluctuation of the temperature over soils cultivated in various ways and over various types of vegetation is desirable. *Subject Headings:* 1. Ground frost 2. Heat balance of Earth's surface 3. Thermal conductivity.—A.V.

10N-237

551.579.5:632.111:633.491

Schippers, P. A., *De invloed van de bodemvochtigheid op de nachtvorst aantasting van pootaarsappelen in Drenthe*. [Influence of soil moisture on night frost damage of potatoes at Drenthe.] Netherlands. *Directie van den Landbouw, Landbouwvoorlichting*, 15(5):230-236, May 1958. 6 tables. **DLC**—Influence of frost during the night June 23-24, 1957 on 200 parcels of "Bintje" potato plants in sandy ground, has been observed at Drenthe. 20% of the cultivated surface was heavily damaged; on 35% there was light damage; on 15% very light damage and on 30% there was no damage. Influence of frost was heavier on dry ground than on humid ground and 75% of the potato plants had been damaged in the dry ground. The harvest, after the frost, was reduced 55% in dry ground, 25% in lightly humid ground and 20% in very humid ground. *Subject Headings:* 1. Soil moisture effects on frost damage 2. Frost damage to potatoes 3. Potatoes 4. Drenthe, Netherlands.—A.V.

10N-238

551.524.37:632.111.5(08)

Society of Agricultural Meteorology of Japan, *Symposium on cool weather damage: (notes of lectures and discussion)*. *Journal of Agricultural Meteorology*, Tokyo, 10(1/2):67-80, Dec. 1954. 4 figs., tables. In Japanese. **DWB**—Three papers were presented: **Peculiarity of cool weather damage in 1953** (by S. KOMIYA of Northeast Agriculture Lab.) discussed the variation of 5-day mean air temperature in the interior, along the Pacific and along the Sea of Japan where the damage ratio was high; second, **Effectiveness of shelter belt and frost damage** (by K. SUZUKI of the Central Meteorological Station) considered the relationship of a shelter belt, and high hill, mountain and forest; third, **Climatology of rice-plant** (by Y. TSUBOI of Agricultural Technology Lab.) dealt with the study of natural and artificial conditions that affect the growth of the rice plant, and the methods of cultivation. The author analyzed the importance of irrigation facilities and control of water temperature. A lively discussion was conducted regarding the influence of the shelter belt on the damage of 1953 and compared the results in the northeast, the coastal area, and in a valley. The main cause of damage is dependent on the variation of low temperature rather than higher water temperature, solar radiation, or Kuroshio, they concluded. *Subject Headings:* 1. Shelter belt effects on frost damage 2. Rice culture 3. Frost damage to rice plants.—K.C.

10N-239

551.584.31:551.524.36/37(477)

Sudakevich, Iu. E., *Mikroklimaticheskaia kharakteristika morozopasnosti territorii Nikitskogo botanicheskogo sada*. [Microclimatic characteristics of frost danger in the Nikitskii Botanical Garden.] Kiev, Ukraine. *Nauchno-Issledovatel'skii Gidrometeorologicheskii Institut, Trudy*, No. 4:99-100, 1958. 4 figs., map (fold.), 12 refs. **DWB**—This is a model microclimatic study on frost danger in the various slopes and valleys of Nikitskii Botanical Garden in order to establish the relationship between microrelief and frost occurrence so as to facilitate the suitable cultivation of subtropical crops. The contents of this investigation include the following: a description of the topography of the Nikitskii Botanical Garden; frost danger, including data on the mean and extreme number of days and hours with frost; frosts of varying intensity for each winter month and for the entire period; dates of the beginning and end of frosts and comparative data on the duration of frosts at Mart'ian Weather Station and other points in the Garden; the incidence of frosts under conditions of advection of cold air and cooling of the atmospheric layer near the ground in the Nikitskii Garden; the method of investigating advection of air temperature inversions, etc.; the distribution of minimum temperature during advective and radiational lowering of temperature; and the practical use of the data on frost danger in plant cultivation. Two maps showing the

distribution of minimum temperatures in the Nikitskiĭ Botanical Garden for radiational and advective weather are presented. *Subject Headings:* 1. Microclimatic studies 2. Frost damage 3. Frost data 4. Ukrainian S.S.R.—I.L.D.

10N-240

551.509.612:551.574.42:551.584.4

Suzuki, S., *The nocturnal cooling of plant leaves and hoarfrost thereon*. *Geophysical Magazine*, Tokyo, 25(3/4):219-235, March 1954. 15 figs., 2 tables, 11 refs., eqs.—Temperature measurements made with thermocouples on glass, paper and plant leaves at freezing temperatures are reported and the resulting freezing curves presented. The purpose of the study was to determine the effect of dew and time formation on the temperature of plant tissues. Sudden rises of temperature may be observed in the curves obtained, corresponding to the freezing of water on the objects or within the plants. The author concludes that a thin film of water sprinkled on trees and garden vegetables when frost is imminent provides protection against freezing damage. The measurements were made both under laboratory and field conditions. *Subject Headings:* 1. Frost protection of plants 2. Hoarfrost on plants 3. Plant microclimatology.—G.T.

10N-241

551.509.61

Winkler, Hugo, *Konstfog dimma som skydd mot nattfrost*. [Artificial fog as protection against night frost.] *Grundförbättring*, Uppsala, 3(1):1-14, 1949/50. 4 figs., 8 refs. *DLC*—The author discusses the nature of night frost and the damage it produces; various means of combatting night frost, in particular artificial fog; and preliminary experiments with artificial fog carried out in the Flanhult Experiment Station. *Subject Headings:* 1. Artificial fog 2. Frost prevention 3. Killing frost 4. Flanhult Experiment Station, Sweden.—I.L.D.

10N-242

551.524.371:632.1111

Woudenberg, J. P. M., *Nachtvorstbestrijding bij lage gewassen door bedekking*. [Night frost control in low crops by covering.] *Netherlands. Directie van den Landbouw, Mededelingen* [van de Directeur van de Tuinbouw, 21(4):198-202, April 1958. 3 figs., 2 tables, 2 refs. *DLC*—In 1954 and 1955 the Royal Netherlands Meteorological Institute carried out experiments with straw, sisal kraft paper, jute and plastic cloth as means to control night frosts. This research has revealed that sisal kraft paper, jute and plastic cloth are suitable for protecting low growing crops against not too heavy night frost. These materials should be put on the crops without any support whatsoever. During calm, bright nights the temperature beneath these materials may be 3°C, and in some cases even 4°C higher than on uncovered plots. Straw turned out to be far less suitable. *Subject Headings:* 1. Frost protection of crops 2. Low growing crops 3. Netherlands.—A.V.

10N-243

551.509.61

Yamagata (Japan) Meteorological Meeting, *On the experiment of the frost protection at Osaragi seedling-field*. Sendai, Japan. *Central Meteorological Observatory, Bulletin of the Meteorological Society for Research of Tohoku District*, 8(2):568-571, Jan. 1955. Also in: *Journal of Meteorological Research*, Tokyo, 6(10/11):568-571, Dec. 1954. fig. In Japanese; English summary p. 568. *DWB*—A frost protection experiment was made at the Osaragi *Cryptomeria* seedling field, Yamagata Prefecture, from the midnight of the 16th to the early morning of the 17th of April, 1953. In this experiment, the oil heater method was reexamined, considering, in particular, the arrangement of oil heaters. The distribution of air temperature near the ground is shown. The authors concluded that this method of protection was useful for their purpose. *Subject Headings:* 1. Frost protection of seedlings 2. Japanese cedar 3. Osaragi, Japan.—Author's abstract.

PARASITIC PLANT DISEASES

ANIMAL VERMIN, PESTS, ETC.

10N-244

551.524:551.521.11:595.7:635.6

Arnoux, J., Labeyrie, V. and Maison, P., *Influence de la température et de l'insolation sur la migration des bruches du haricot dans la nature*. [Influence of temperature and insolation on the migration of bean beetles in nature.] *Académie des Sciences, Paris, Comptes Rendus*, 247(25):2443-2445, Dec. 22, 1958. 2 refs. *DWB, DLC*—Experimental study on the migration of the bean beetle (*Acanthoscelides obsoletus*). The daily migrations have been compared with respect to the maximum temperature and the duration of insolation registered during the day. A regression formula has been established; it shows that the migration of the bean beetles in the fields necessitates high temperature and sufficient insolation. The regression of the maximum temperature is always very highly significant but never succeeds in concealing the effect of insolation duration. *Subject Headings:* 1. Bean beetles 2. Temperature effects on migration of bean beetles 3. Insolation effects on migration of bean beetles 4. France.—A.V.

10N-245

551.524.3:632.77.634.63(569.4)

Avidov, Z., Phenology of the olive fruit fly in the coastal plain of Israel. *Rehovot, Israel. Agricultural Research Station, Ktavim. Records*, 8(1/2):105-116, Feb. 1958. 3 figs., 6 tables, 4 refs.

LC, NN—Sampling of the olive fruit fly population by means of trap jars was carried out during the years 1952-1956 in the large olive grove at Hulda, consisting mainly of local olive varieties, in addition to a small area of European olives. The total catch in the section of local olives was about 40% higher than in that of European olives. Population trends for both varieties were parallel. The peak in trapping occurred during Oct.-Nov., when about 50% of the total annual catch was lured. The ebb in trap yields was recorded during the first months of the year. A direct relation exists between the number of flies caught in Nov. and those trapped the following June. A July mean temperature of over 26°C resulted in a low number of flies during the following summer months; after a cooler July, trapping was remarkably high. The number of flies available during June and July and the temperature during the latter month determine the reproductive capacity of the summer generations, and hence the extent of infestation of fruits picked for green pickling during Aug. and Sept. Local olives are attacked by the fly at least a month later than are the European ones. Therefore, the temperature and the availability of flies during July-Aug. are decisive in regard to an attack in the former, when picked green in Sept. and Oct. Regular trapping of flies and temperature readings can provide an accurate indicator for the proper timing of control applications. When a monthly mean temperature in autumn ranges between 23-24°C, the fly population increases steadily, causing great damage to fruit left on the trees after Oct. However, from late Nov. to early Dec. oviposition ceases and the attack subsides. *Subject Headings: 1. Olive culture 2. Olive fruit fly phenology 3. Temperature effects on olive fruit flies 4. Israel.—A.V.*

10N-246

551.586:595.7:634.38

†Bénassy, C., Etude bio-écologique de *Pseudaulacaspis Pentagona* Targ. et de son parasite spécifique *Prospaltella Berlesesi* Howard, en France. [Bioecological study of *Pseudaulacaspis Pentagona* Targ. and of its specific parasite *Prospaltella Berlesesi* Howard, in France.] *Paris. Institut National de la Recherche Agronomique, Annales, Ser. C., Annales des Epiphyties*, 9(4):425-496, Oct.-Dec. 1958. 32 figs., 11 tables, bibliog. p. 494-496. CU—At the present time, in France, damage caused by the cochineal of the mulberry tree (*Pseudaulacaspis Pentagona* Targ.) is limited to two distinct regions: southern Mediterranean and Lyonese regions. This bioecological study of this insect is concerned especially with the role of climatic factors affecting lineage. The author obtained a linear correlation existing between the natural mortality which strikes hibernating females and the number of days with minimum temperature less than -10°C during the month of Feb. On that account, the surviving fraction of the hibernating states varies from one year to another. Survival is generally higher in the southern area than in the Lyonese region. Limited longevity of full grown insects, in connection with the external microclimatic conditions, determines, in the first place, egg laying. *Subject Headings: 1. Cochineal insects 2. Mulberry trees 3. France.—A.V.*

10N-247

551.586:634.11:632.7

Bonnemaison, L. (Station Centrale de Zoologie Agricole, Versailles), Facteurs d'apparition des formes sexupares ou sexuées chez le puceron cendré du pommier. [Factors of appearance of sexuparous or sexed forms of ash grey aphids of the apple tree.] *Paris. Institut National de la Recherche Agronomique, Annales, Ser. C., Annales des Epiphyties*, 9(3):329-353, July-Sept. 1958. 4 figs., 4 tables, 4 refs. CU—Temperature and light play an important part in the appearance of sexed forms of the ash grey aphids of the apple tree. Constant temperature at 22° partially inhibits the generation of the alated sexupara and males; constant temperature at 24° inhibits the birth of alated sexupara from the third day and that of males in the following generation, i.e. less than 22 days after the beginning of the experiment. Effects of alternated temperatures appear only when maximum and minimum temperatures differ by at least 10° and are pronounced only when the difference is about 20°. A photoperiod lasting for 8-13.30 hrs starts generation of alated sexupara and afterwards that of males. Sexed forms, mainly males, appear throughout the year, even when duration of illumination is continually 16 hrs, or during the period when duration of the day reaches its maximum. Once sexed breeding has set in, a long photoperiod is unable to inhibit generation of sexed forms so long as the mean temperature remains less than or equal to 22°. *Subject Headings: 1. Aphids 2. Climatic effects on aphids.—A.V.*

10N-248

551.586:632.9

Climate and tree condition as factors in scale control. *California Citrograph*, Los Angeles, 37(6):232, April 1952. DA—Black scale is shown to be affected by weather as well as by climatic differences. It does not thrive in hot moist climates such as Florida since the wilting condition is most favorable for the pest. Even slight changes in the environment increase immunity to the disease, since the citrus is not a preferred host plant for the black scale. Certain water, fertilizer

and weather conditions cause plant growth that renders the citrus fruit unsuitable for the pest. There are 100 species of scale insects that attack citrus. *Subject Headings:* 1. Climatic effects on citrus pests 2. Weather effects on citrus pests 3. Citrus pests 4. Southern California. I. Flanours, Stanley E.—M.R.

10N-249

551.586:632.2

†Couturier, A. and Robert, P. (*Station de Zoologie Agricole, Centre de Recherches Agronomiques d'Alsace, Colmar*), *Recherches sur les migrations du hanneton commun (Melolontha Melolontha L.)* [Investigations on the migrations of the common cockchafer *M. melolontha* L.] Paris. Institut National de la Recherche Agronomique, Annales, Ser. C, *Annales des Epiphyties*, 9(3):257-328, July-Sept. 1958. 32 figs., 29 refs. French, English and German summaries p. 323-326. DA—The maintenance of flight direction during migrations (oviposition flights and return flights after oviposition) in spite of climatic variations and independently of landscape, explains the ethology of *M. melolontha* whose breeding places remain generally localized. Some cosmic marks could be shown: the sun serves as a guide during day journeys and the authors could distract insects by hiding the sun and showing them its picture in a mirror, serving now as a guide. Sensibility to polarized light could not be put in evidence. The cockchafers can determine a direction during a prealimentary migration done under a cloudy sky; they find this direction again the following days though the sky may be entirely covered. They are however disoriented by those weather conditions if the prealimentary flight has been done during clear weather. In nature, the flights are observed at sunset and during fine mornings; there is no activity in the afternoon. In prealimentary crepuscular flights, captured insects, released in the afternoon in an unknown landscape, are unable to find out their flight direction, so they fly to the nearest attractive matter. However, the females ready for oviposition are disturbed only a little. The nycthemeral rhythm is broken by darkness or artificial lighting and the insects no longer wish to fly. *Subject Headings:* 1. Cockchafers 2. Climatic effects on cockchafers.—From authors' abstract.

10N-250

551.586:634.11:632.2+632.963

†Evenhuis, H. H. (*Inst. for Res. on Plant Diseases, Wageningen, Netherlands*), Een oecologische onderzoek over de appelbloedluis, *Eriosoma lanigerum* (Hausm. p.), en haar parasiet *Aphelinus mali* (Hald.) in Nederland. [Ecological investigations of the woolly aphid, *Eriosoma lanigerum* (Hausm.) and its parasite *Aphelinus mali* (Hald.) in the Netherlands.] *Tijdschrift over Plantenziekten*, Wageningen, 64(1):1-103, 1958. 13 figs., 25 tables, bibliog., p. 100-103. English summary p. 87-99. DA, DLC—The woolly aphid is a serious apple pest in the Netherlands. This paper outlines the results of investigations made in relation to the influence of *Aphelinus mali* on its host, the woolly aphid. Many tables are presented, concerning the life cycle of the woolly aphid and/or *Aphelinus mali*, such as: the duration of development and the offspring at several constant temperatures and air humidities; the number of progeny at constant temperature and inconstant room temperatures; the duration of development at inconstant room temperature; the egg production at inconstant room temperature, etc. A diagrammatic comparison is made of the capacity of increase of *Eriosoma lanigerum* and *Aphelinus mali* at 18°C. *Subject Headings:* 1. Apple trees 2. Woolly aphids 3. Netherlands.—A.V.

10N-251

551.584:632.96

Evenhuis, H. H., Over de invloed van de winter op de parasitering van de appelbloedluis, *Eriosoma lanigerum*, door haar parasiet *Aphelinus mali*. [On the influence of winter on the parasitism of the woolly aphid, *Eriosoma lanigerum*, by its parasite *Aphelinus mali*.] *Tijdschrift over Plantenziekten*, Wageningen, 64(4):328-332, 1958. 2 figs., table, 6 refs. English summary p. 331. DLC—In the Netherlands the winter of 1955/56 was very severe and the winter of 1956/57 very mild. Since the woolly aphid is much more susceptible to low temperatures than its parasite, these two winters had remarkable consequences for parasitism in the summers, following these winters. In 1956 almost all woolly aphids were killed by the severe frost in February. In the autumn a small infestation by the woolly aphid was observed and also a low rate of parasitism. As a result of the mild winter of 1956/57 relatively many aphids survived. At the beginning of the season of 1957 the ratio of parasites to aphids was also very low. Hence the influence of the first generation of *Aphelinus mali* in May was hardly observed (in the preceding years there was very marked parasitism in this period). In the summer of 1957, however, the parasite recovered completely with respect to its host, the woolly aphid, and in September a parasitism of 68% was reached. *Subject Headings:* 1. Parasites 2. Winter effects on parasites 3. Netherlands.—Author's abstract.

10N-252

551.524.3:632.7

Fenwick, D. W., The effect of temperature on the development of the potato-root eelworm *Heterodera rostochiensis*. *Annals of Applied Biology*, Cambridge, England, 38(3):615-617, Sept. 1951. 2 tables, ref. Abstracted from reprint.—Experiments showed that soil temperatures above

°C were unfavorable to development of the pest, and 31°C almost inhibited development and multiplication. *Subject Heading: 1. Potato pests.—C.E.P.B.*

10N-253

551.586:632.7

Feron, M. and Guennelon, G., *Recherche d'éléments écologiques en vue de la lutte contre la Cecidomyie des lavandes*. [Search for ecological elements to help combat *Cecidomyia* of lavender.] Paris. Institut National de la Recherche Agronomique, *Annales. Ser. C., Annales des Epiphyties*, (1):11-26, Jan./March 1958. 4 figs., 6 refs. **DA**—Statement of results of systematic observations undertaken on the *Cecidomyia* of lavender in order to specify the aspect and progress of damage, the process of the insect's development, the search for a vulnerable stage and its active stage. Differences in attack are noted according to a certain number of factors among which exposure of the lavender plant is the most definite. Insolation and shelter from the wind promote the attacks. *Subject Headings: 1. Lavender pests 2. Insect pests.—A.V.*

10N-254

551.584.43:595.7

Henson, W. R. (Yale Univ. School of Forestry), *Some ecological implications of the leaf-rolling habit in *Compsolechia niveopulvella* Chamb.* Canadian Journal of Zoology, (Ottawa), 36:809-818, 1958. fig., 8 tables, 4 refs. **DLC**—The provision of shelter within tied leaves is shown to increase and modify feeding of *Compsolechia niveopulvella* Chamb. in a manner similar to the effect produced by raising ambient humidity. On this basis, the leaf-rolling habit of the larvae of this insect is concluded to be of direct selective advantage from the viewpoint of water economy as well as habitat temperature. *Subject Heading: 1. Insect microclimatology.—Author's abstract.*

10N-255

551.524:595.7

Hessian fly. U. S. Weather Bureau, *Weekly Weather and Crop Bulletin*, 42(39):7-8, Sept. 26, 1955. 3 figs. **DWB**. Information extracted from U. S. Dept. of Agriculture, *Farmers' Bulletin*, No. 1627. **DA**—The Hessian fly is the most destructive insect pest of wheat in the U. S. inflicting damage as high as \$100 million in a single year. Area of incidence is shown on a map to cover the entire NE and N Central and part of the immediate Pacific Coast area N of San Francisco. Since it is only retarded by moderate cold (36°F) and drought, and is killed by only very high temperatures, it is important to plant winter wheat in the fall after most of the fall brood has disappeared. Dates when wheat planting is safe, as a rule, from Hessian fly injury are shown on an isochronal chart of Central States. They vary from Sept. 12 in S. Wisconsin and Minn. to Oct. 27 in N. Georgia. *Subject Headings: 1. Temperature effects on insects 2. Winter wheat planting dates 3. Hessian fly climatology 4. United States.—M.R.*

10N-256

551.586:551.524:576.88:634.11

Klingler, J.; Vogel, W. et al., *Der Einfluss der Temperatur auf die Eiablage des Apfelwicklers*. [The influence of temperature on the laying of the apple leafroller.] *Schweizerische Zeitschrift für Obst- und Weinbau*, Wädenswil, 67(10):256-262, May 17, 1958. 5 figs.—Results of the enrichment surveys made at Wädenswil in 1955 and at Zurich in 1956 on isolated apple trees under a muslin cover. The number of eggs for each lepidopteran increases with the temperature; the laying begins at a temperature of 12° (at 9:30 p.m.) and reaches its maximum at 20°. Unfavorable atmospheric conditions (rain and wind) cause an interruption or a temporary decrease followed by a pronounced recrudescence. *Subject Headings: 1. Apple pests 2. Temperature effects on apple pests.—Authors' abstract.*

10N-257

551.586:551.524:595.7

Kühnheit, Wilhelm; Piffel, Eduard and Schremmer, Friedrich, *Schwärme von Schildwanzen über dem Stadtgebiet von Wien*. [Swarms of soldier bugs over Vienna.] *Wetter und Leben*, Vienna, 6(3/4):73, June 1954.—The sudden appearance of swarms of *Eurygaster maura* and *E. austriaca* and other insects in the parks and gardens of Vienna in April 25, 1953, is attributed to a rise in air temperature following a rather long interval of cool humid weather. *Subject Headings: 1. Temperature effects on insects 2. Insect ecology 3. Vienna.—I.L.D.*

10N-258

551.586:633.71:632.75:591.543

Michel, E., *Influence des écarts de température sur des colonies de pucerons (*Myzus Persicae*) établies sur tabac*. [Influence of changes in temperature on colonies of aphids (*Myzus Persicae*) settled on tobacco.] *Académie d'Agriculture de France, Paris, Comptes rendus*, 45(9):437-444, May 6, 1959. 6 figs. **DLC**—Experiments carried out at the Experimental Institute for Tobacco at Bergerac, France, have proved that the peach fly infesting tobacco plants, is found in profusion when diurnal changes in temperature and humidity are slight. On the other hand, aphids are affected by changes in temperature occurring together with changes in humidity. This result was corroborated through laboratory experiments. Three types of experiments were considered: 1) Both

temperature and humidity remain constant. 2) One of the factors is variable, the other remaining constant. 3) The two factors vary simultaneously. Critical differences beyond which fluctuations are noted in the number of aphids, should be in the range of 12–13°. Differences greater than 12°55 correspond to abrupt retrogression; differences less than 12°5 correspond to intense pullulation. This result has a great practical importance for tobacco culture. *Subject Headings:* 1. Tobacco cultivation 2. Aphids 3. Temperature effects on aphids.—A.V.

10N-259

632:595.77

Mostatt, Hermann, *Die Wanderheuschreckenkämpfung als ein Problem von internationaler Bedeutung*. [The fight against migratory locusts as a problem of international importance.] *Naturwissenschaftliche Rundschau*, 4(5):211–213, May 1951. 4 figs. DWB—Illustrates migration of locusts from W. to S. Africa 1928–34. Describes other invasions, work of antilocus conferences, organization and methods. *Subject Headings:* 1. Locusts 2. Insect migration 3. Antilocus conferences.—C.E.P.B.

10N-260

551.509.59:632.9)

Poliakov, I. Ia., *Znachenie meteorologicheskikh nabludenii dlia prognoza razvitiia vreditelei i boleznei sel'skokhoziaistvennykh kul'tur*. [Importance of meteorological observations for predicting the development of pests and diseases in agriculture.] *Meteorologiya i Gidrologiya*, No. 9:33–36, Sept. 1956. DWB, DLC—Examples are presented of the use of meteorological data in protecting plants against diseases and predators, and the function of the special service in the U.S.S.R. for forecasting the onset of pests. In order to forecast the appearance of rodents, data are necessary on ground freezing; mean daily temperatures must be known in order to forecast the appearance of various types of insect pests, etc. Numerous examples of pest and predator forecasting are discussed. *Subject Headings:* 1. Pest forecasting 2. Plant diseases-weather relationships.—I.L.D.

10N-261

551.586:551.524:595.7

Schrödter, H., *Der Einfluss der Temperatur auf das Auftreten und die Entwicklung des Mohnkapselrüsslers*. [The influence of temperature on the emergence and development of the poppy capsule borer.] *Angewandte Meteorologie*, 1(6):180–184, June 1952. 3 figs., table, 5 refs.—The dependence of egg deposition and larval development of the poppy capsule borer was investigated under field conditions. The relationship of egg deposition and temperature was determined by the method of frequency correlation analysis whereby hourly temperature readings in the regular instrument shelter were grouped into overlapping classes and correlated with number of infected plants. The poppy borer prefers a temperature of 20–25°C for egg deposition. In order to determine the effect of temperature upon larval development and on the emergence of the larvae from the poppy capsules the thermal zero temperature for larval development was determined. It is 13°C and the larvae leave the capsules at a summation temperature of 98° above this zero. *Subject Headings:* 1. Temperature effects on poppy capsule borers 2. Poppy capsule borers.—I.L.D.

10N-262

551.586:551.524:634.33:632.7

Swirski, E. and Amitai, S., *Contribution to the biology of the citrus rust mite (Phyllocoptruta Oleivora ASHM.) A. Development, adult, longevity and life cycle*. Rehovot, Israel. Agricultural Research Station, Klatvim. Records, 8(3/4):189–207, Aug. 1958. 8 figs., 5 tables, 12 refs. DLC, NN—For approximately 2 yrs the citrus rust mite has been bred and its different stages, length of life, and death rate of adults have been studied. The theoretical threshold of development of both egg and larva is 9.2°C. In summer the development of these two stages together takes 4–6 days, and in winter it can reach 2 months. Adult longevity depends, among other factors, on temperature. Maximum length of life at 12–18°C (mean temperature) was 36–37 days, at 20–23°C, 24 days, and above this temperature 20 days. Death rate is lowest at 16–18°C, high at 12–13°C, and increases proportionally with the increase in temperature above 20°C. In the coastal plain the mite reproduces in all seasons. In Rehovot there are 28 or more generations annually (from egg to egg). Calculations were made as to the number of annual generations in the months from Jan.–March, both in Israel and abroad. In Rehovot the citrus rust mite produces 2–4 generations from Jan.–March. During this season the mite is a potential pest every year and the extent of its damage depends, among other factors, on the temperature. If the temperature rises there is likely to be a severe outbreak in the citrus groves. *Subject Headings:* 1. Citrus orchards 2. Citrus mites 3. Temperature effects on citrus mites 4. Israel.—A.V.

10N-263

595.7:551.524.36

Tinker, Milton E., *The seasonal behavior and ecology of the boxelder bug Leptocoris trivittatus in Minnesota*. *Ecology*, 33(3):407–414, July 1952. 4 figs., 2 tables, 8 refs. DLC—Effect of maximum and minimum air temperature on the bug is investigated and the relative abundance dependent

on degree-days, using 20°C as the threshold of development, is discussed. *Subject Headings:*

1. Temperature effects on insects 2. Insect ecology 3. Minnesota.—A. Assur.

10N-264

551.586:595.72(4)

†Uvarov, B. P., *The aridity factor in the ecology of locust and grasshoppers of the Old World. UNESCO Arid Zone Research*, 8:164-198, 1957. 308 refs. French summary p. 187-190. DWB (M86.599.9 U58h)—Facts known about the geographic distribution, migration and behavior of the different varieties of desert locust, migratory, red, brown, Moroccan and Australian locust, and various grasshoppers (each treated in separate chapters) are reviewed with extensive reference to world literature. *Subject Headings:* 1. Insect ecology 2. Aridity effects on locust ecology 3. Locusts.—G.T.

10N-265

551.586:595.7

Wellington, W. G. (Canada), *Meteorology in population dynamics. International Journal of Bioclimatology and Biometeorology*, Leiden, Netherlands, Vol. 2 (Pt. 3), 1958. 4 p. DWB—The relation between weather and the population dynamics of insects involves not only a study of the microclimate near or among plants but also the relating of this microclimate to the general synoptic situation. The application of this approach is illustrated by a study of the changes in abundance of the western tent caterpillar over a period of eight yrs on a small peninsula on the southeastern corner of Vancouver Island, B. C. In spite of the heavy infestation, especially on the eastern shore, a large section of the western side of the peninsula was free from tent caterpillars. The western side of the peninsula is divided into three sections with respect to topographic effects on airflow so that variations in cloudiness are produced. The areas that had the densest clouds, least sunlight, and highest precipitation intensity during particular circulation patterns were in the central part of the western side where subsidence of incoming air does not begin until it is well over the peninsula. Harmful weather for tent caterpillars includes both extremes: hot and dry and cold and wet. Ideal weather consists of low moderate air temperatures associated with intermittent sunshine and with occasional showers. The possibility of predicting outbreaks of infestation of tent caterpillars from synoptic conditions is discussed. *Subject Headings:* 1. Insect bioclimatology 2. Caterpillars 3. Vancouver Island, B. C.—I.L.D.

PLANT BACTERIA, FUNGI, ETC.

10N-266

551.586:551.525.2:632.3

Bowen, G. D. and Kennedy, Margaret M., *Effect of high soil temperature on Rhizobium SPP. Queensland Journal of Agricultural Science*, Brisbane, 16(3):177-192, Sept. 1959. 9 figs., 5 tables, 12 refs. NNA, DA—Following field observations of poor nodulation of legumes sown on hot days, the possible effects of high soil temperatures on legume bacteria were studied. Eighty-seven strains of legume bacteria on nutrient agar showed maximum temperatures for growth of 31-38.4°C, 32-32.7°C, 36.5-42.5°C and 30-42°C for clover, pea, medic, and tropical legume of *Rhizobium* respectively. Studies of the decline of viable population in sterile wallum-heath sand at 40°C indicated the rapid death of pea and clover strains: the death of tropical legume strains within 10 hrs; and an initial drop of numbers of lucerne organisms followed by a lesser death rate. Sowing inoculated seed into moist soil followed by holding at 40°C before planting, showed that strain of legume bacterium, initial concentration of inoculum and time of subjection to high temperatures are significant factors operating in the survival of legume bacteria on the seed. Methods of overcoming deleterious effects of high soil temperatures are discussed. *Subject Headings:* 1. Legume bacteria 2. Soil temperature effects on legume bacteria.—Authors' abstract.

10N-267

551.586:632.3:633.11

*†Craigie, J. H. (Lab. of Plant Pathology, Winnipeg), *Epidemiology of stem rust in Western Canada. Scientific Agriculture*, Ottawa, 25(6):285-401, Feb. 1945. 27 tables, 13 figs., 240 refs. Photostat. DWB—Over half of this comprehensive monograph (p. 317-361) and much of the tabular and graphical material are devoted to a study of the relation of meteorological factors to the development of stem rust, particularly in Alberta, Saskatchewan and Manitoba (1916-1938). The factors which are considered are humidity, temperature, light and wind. The evidence seems to indicate that the rust does not develop from local sources of infection, but is imported by wind from the Red River Valley in Manitoba where it first appears in late June or early July (probably coming from the Mississippi Valley) and spreading to Saskatchewan and Alberta where it appears a month later. Southerly winds over Manitoba from June 12-July 20, and high humidity, rainfall and dew frequency with attending high temperatures seem to correlate positively with great rust prevalence. Favorable winds are necessary to introduce the inoculum but abundance of spores must also be present. *Subject Headings:* 1. Wheat rust 2. Climate of Western Canada 3. Western Canada.—M.R.

10N-268

551.586:633.77

Fowler, Robert L.; Desrosiers, Russell and Hopp, Henry, Evaluation of certain factors affecting the yield of cacao in Ecuador. *Ecology*, Durham, N. C., 37(1):75-81, Jan. 1956. 5 figs., 2 tables; 8 refs. **DWB, DLC**—The amount of rainfall, influence of witches'-broom disease and *Monilia* pod rot disease, percent of total sunlight falling on the cacao trees, area of plantations in cacao and area of land per tree were analyzed with respect to their effect upon yield of cacao in Ecuador. Graphs are presented giving for Pichelinque, Ecuador the 6-yr monthly average of rainfall, relative humidity and temperature. A highly significant negative correlation exists between yield and rainfall, yield and witches'-broom and yield and area of plantation. No correlation exists between yield and incidence of *Monilia* pod disease. *Subject Headings*: 1. Cacao cultivation 2. Cacao yield 3. Cacao tree blight 4. Rainfall effects on cacao yield 5. Ecuador.—I.L.D.

10N-269

551.586:632.3

Fujikawa, T.; Okadome, Z. and Utsunomiya, T., On the widespread occurrence of blast diseases in Oita prefecture in 1953. *Journal of Agricultural Meteorology*, Tokyo, 11(2):76, Oct. 1955. 11 figs., 1 table; 10 refs. **DWB**—Damage was over 60% of the total area under cultivation: leaf disease attacked over 25% and ear disease 12%, mostly in the central region and the high, cold areas. Meteorological causes were as follows: 1) Low temperature, especially when accompanied by less sunshine and a large amount of rainfall in the middle of July and at the beginning of Sept. aided the spread of the disease. 2) Heavy rainfall with little sunshine from the end of May to the middle of July, and high temperatures from the end of July to the middle of Aug. fostered development of the disease. *Subject Headings*: 1. Climatic effects on fungus diseases 2. Brusone 3. Japan.—K.C.

10N-270

551.524.36:551.521.16:632.3

Jerebzoff, Stephan, Action opposée du froid et de la lumière sur la croissance des conidiophores de *Monilia fructicola*. [Contrary action of cold and light on the growth of conidiophores of *Monilia fructicola*.] *Académie des Sciences, Paris, Comptes rendus*, 268(10):1576-1579, March 9, 1959. 2 figs., ref. **DWB, DLC**—Study of the action of light and darkness on the growth of the fertile conidiophores of *Monilia fructicola* at low temperatures, with description and results of experiments. In darkness, low temperatures prolong the growth of conidiophores and greatly increase their height. Continuous illumination, or even illumination of a short duration (e.g. 1 hr), supplied before or at the beginning of the cold period, removes the positive action of low temperatures or reduces it by about 50%. *Subject Headings*: 1. Fungus diseases of fruit trees 2. Low temperature effects on fungus diseases 3. Light effects on fungus diseases.—A.V.

10N-271

551.524.36:632.3:633.3

Kangieser, Paul C. (State Climatologist, Phoenix, Ariz.), Bacterial wilt and Stewart's leaf blight of corn. *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 43(17):7-8, April 23, 1956. 3 figs., 4 refs. **DWB, DLC**—Three maps of Massachusetts for various years of observations are given for temperature indices representing the mean monthly and average temperatures at different points in that state. The development of bacterial wilt and Stewart's leaf blight is related to the previous winter temperatures. If the Dec., Jan. and Feb. average temperature totals less than 100°F the wilt on sweet corn is not likely to occur. Dent corn can readily stand severe attacks of the leaf blight when the total average temperature is not more than 85°. In the South, bacterial wilt and Stewart's leaf blight tend to build up to epidemic proportions after several mild winters. *Subject Headings*: 1. Temperature effects on corn blight 2. Mild winters—corn blight relationships 3. Corn blight 4. Massachusetts.—N.N.

10N-272

551.586:581.2:632.4

Kole, A. P. (Lab. for Phytopathology, Agric. Univ., Wageningen), *Plasmodiophora brassicae* en *Spongospora subterranea*, punten van overeenkomst en verschil. [Plasmodiophora brassicae and Spongospora subterranea, points of resemblance and difference.] *Tijdschrift over Plantenziekten Wageningen*, 65(2):47-55, 1959. 9 tables, 7 refs. Dutch and English summaries p. 54-55. **DWB, DLC**—The symptoms of clubroot are easily produced by sowing or planting susceptible plants in contaminated acid soil. The occurrence of powdery scab is largely independent of soil reaction but is governed by antagonistic relations in the soil. The optimum temperature for clubroot is about 25°C and for powdery scab below 20°C. The infectivity of resting spores of *S. subterranea*, kept in the soil under continuously moist conditions, gradually diminishes but can be restored by air drying the soil. In contrast, drying the resting spores of *P. brassicae* decreases their ability to cause infection. Resting spores of both *P. brassicae* and *S. subterranea* are not killed when exposed to a low temperature (three days at -20°C). Resting spores of *S. subterranea* can be stored dry for a long period without loss of vitality (after six yrs' storage no loss of germinative power has been observed). Resting spores of *P. brassicae* can be stored best in water at 2-3°C (for at least two yrs). *Subject*

eadings: 1. Clubroot 2. Powdery scab 3. Temperature effects on fungus diseases 4. Soil moisture effects on fungus diseases.—From author's abstract.

10N-273

551.586:576.88:634.8

Kundert, J., *Die Peronospora der Rebe und ihre Bekämpfung im Jahre 1957*. [*Peronospora* of vines and the action against it during 1957.] *Schweizerische Zeitschrift für Obst- und Weinbau*, Wädenswil, 67(2):40-45, Jan. 25, 1958; *Ibid.*, 67(5):137-140, March 1958. 3 figs., 4 tables.—The author treats the evolution of the *Peronospora* attack on vines, in connection with temperature, precipitation and rainy days from May until September 1957 at Wädenswil. He considers the case of vines irrigated against diseases and nonirrigated vines and names the different products for sprinkling. The various protection methods against the *Peronospora* must be chosen according to the existing atmospheric conditions. *Subject Headings*: 1. Climatic effects on mildew diseases 2. Mildew of vineyards 3. Cognac, France.—A.V.

10N-274

551.574.2:632.4:634.8

Lafon, J.; Couillaud, P. and Gay-Bellile, F., *Technique des brouillards légers aquaux à 30 litres de liquide par hectare*. [Technique of light aqueous fogs, containing 30 litres liquid per hectare.] *Académie d'Agriculture de France, Paris, Comptes rendus*, 43(5):211-221, Feb. 26, 1958. DLC—An organo-cupric compound sprayed over the vegetation through the light fog technique, by means of a compressed air vaporizer permitting the spraying of only 30 liters of liquid per hectare, was tested at the Cognac Viticultural Station in 1957. The authors give a description of the apparatus and of the experimental device and report the results obtained in the fight against mildew. They draw attention to the importance of the size of the drops and point out that spraying by means of a compressed air vaporizer, in which the splitting of the liquid is caused by a violent air stream, permits the simultaneous treatment of both faces of the leaf. *Subject Headings*: 1. Artificial fog treatment techniques 2. Mildew of vineyards 3. Cognac, France.—A.V.

10N-275

551.586:632.4 551.508.79

Liebster, G. and van Eimern, J., *Hilfsmittel zur Bestimmung der Spritztermine in der Schorfbekämpfung*. [Auxiliary instruments for use in determining the length of time required to spray in order to combat scab.] *Der Erwerbsobstbau*, Berlin, 1(4):70-74, 1959. 3 figs., table, 14 refs. DA—The following observations are needed for determining the length of time required to spray, in order to combat scab: 1) Duration of the ascospores' flight, 2) Duration of the wetness of leaves, 3) Temperature during the period of the wetness of leaves. The first point is a question to be resolved by botanists or other qualified specialists. For the determination of the duration of the wetness of leaves, different instruments are used and a "hemp-wire" recorder and dew balance seem particularly recommended. Results are discussed. A thermograph is recommended for the observation of the temperature during the period mentioned. *Subject Headings*: 1. Scab prevention 2. Fungus diseases of plants.—A.V.

10N-276

551.524.3:632.4:633.11

Naumova, N. A., *Vliianie temperaturnykh uslovii rosta iarovoi pshenitsy na porazhaemost' ee zaroi rshavchinois*. [Influence of thermal conditions of summer wheat growth on wheat mildew.] *Botanicheskii Zhurnal*, Moscow, 36(1):39-46, 1951. 7 tables, refs. DLC—Relation between climatic factors and intensity of wheat mildew development on summer wheat was investigated during 1939 in Leningrad, Rostov-on-Don, Bezenchuk and Irkutsk. It was found that the air temperature is the most important factor for the development. Damage from wheat mildew was less for earlier sowings, when germination of plants began at lower air and soil temperatures. *Subject Headings*: 1. Wheat mildew 2. Temperature effects on wheat mildew.—N.T.Z.

10N-277

632.4:633.11:551.586

†Overlaet, Jos., *Opzoekingen in de roestziekten van de tarwe*. [Research on wheat rust.] *Nederlandsche Academie voor Wetenschappen, Letteren en Schoone Kunsten van België, Verhandelingen*, No. 57, 1958. 135 pp. 7 figs., 17 photos, 15 tables, 85 refs. English summary p. 110-111. DLC—The present study was carried out at the Plant Breeding Station of Heverlee (Louvain, Belgium) during the years 1955, 1956 and 1957. This research work was organized as an introduction to a wheat breeding program for rust resistance because such an investigation had never been made in Belgium. After a succinct review of actual knowledge in the biology of rust fungus, the study of three important problems was undertaken: the epidemiology of the three species of wheat rust under Belgian climatic conditions; the resistance of some of the most important wheat varieties, cultivated in Belgium and Holland; and a short survey of the behavior of host plants and rust parasites in the different climatic regions of Belgium. *Subject Headings*: 1. Wheat rust 2. Climatic effects on wheat rust 3. Belgium.—From author's abstract.

10N-278

551.509.58:632.9:633.49

†Raeuber, Albrecht, *Untersuchungen zur Witterungsabhängigkeit der Krautfäule der Kartoffel im Hinblick auf einen Phytophthora-Warndienst*. [Investigations on the dependence of potato blight on weather with reference to a *Phytophthora* warning service.] Germany. *Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Abhandlungen*, 6(40), 1957. 38 p., 7 figs., 7 tables, 57 refs. DWB, DLC—The existing *Phytophthora* warning rules are examined critically and a proposal is made to improve their accuracy by measurements of spore catches. The contents of this monograph are as follows: the effect of meteorological factors upon *Phytophthora infestans*, including weather in general, atmospheric humidity and temperature, wind, light and atmospheric pressure; critical examination of the warning service rules including present rules and their validity for Gross-Lüsewitz, and the improvement of "zero time" by phenological data; the relationship between microclimate and potato blight and spore catches of *Phytophthora* during 1953-54 in Gross-Lüsewitz. The appendix contains photographs of the spore collector and data on spore catches. *Subject Headings*: 1. Potato blight weather 2. Potato blight warning services 3. Gross Lüsewitz, Germany.—I.L.D.

10N-279

551.586:633.71:6322

Rossouw, D. J. (*Sentrale Tabaknavorsingstasie, Rustenburg, South Africa*), *Die invloed van temperatuur en humiditeit op die poeieragtige meeldouswam van tabak*. [The effect of temperature and humidity on the tobacco powdery mildew fungus.] *South African Journal of Agricultural Science*, Pretoria, 2(1):19-31, March 1959. 2 figs., 5 tables, 11 refs. English and French summaries, p. 30. DLC—The influence of temperature on the germination of conidia and on the infection of tobacco by powdery mildew was determined. For the former the minimum, optimum and maximum temperatures were found to be lower than 5°C, between 24-25°C and between 30-35°C, and for the latter 5°, 23.5° and 25°C respectively. The existence of a very close correlation between the occurrence of powdery mildew in certain tobacco areas and the average daily maximum-minimum temperatures prevailing in those areas could be shown. It was found, for example, that powdery mildew did not occur in areas in which the prevailing average daily maximum-minimum temperature were 25°C or higher. Relative humidity on the other hand, has much less influence than temperature on either the germination of the conidia or the occurrence of powdery mildew in different tobacco areas. It was found, e.g., that the conidia could germinate under conditions in which the R.H. varied from 0-100% between temperatures of 15° and 30°C. Furthermore, no correlation between relative humidity and the occurrence of powdery mildew could be found. *Subject Headings*: 1. Tobacco cultivation 2. Fungus diseases of tobacco 3. Climatic effects on fungus diseases.—A.V.

10N-280

551.509.5:632.9:633.49

Šikić, M., Krumpirova plijesan (*Phytophthora infestans*) i način borbe protiv nje. [Potato blight (*Phytophthora infestans*) and methods of combating it.] Yugoslavia. *Hidrometeorološki Služba, Vesnik*, 5(1/2):19-23, Jan./June 1956. 3 refs. DWB—Various meteorological indexes (mostly expressed in terms of minimum temperature and relative humidity) for predicting the occurrence of potato blight are reviewed. Experiments made in Slovenia proved the success of such forecasting. Establishment of a potato blight warning service in Croatia is recommended and organizational requirements of such a service are outlined. *Subject Headings*: 1. Potato blight forecasting 2. Potato blight warning services 3. Slovenia, Yugoslavia.—G.T.

10N-281

551.509.58:632.9:633.49

Uhlig, Siegfried, *Untersuchungen zum Problem der Phytophthora-Warnungen*. [Investigation of the problem of potato blight warning.] Germany. *Deutscher Wetterdienst, Bericht*, 5(37), 1957. 27 p., 13 figs., 2 tables, 9 refs. DWB, DLC—An examination of the principles underlying the operation of the experimental *Phytophthora* warning service carried out by the German Weather Service during 1954-56 and of the success of the techniques employed. The fundamental basis of the forecasting method is the stand humidity rule which takes into account the criteria for the weather situations favoring the development of *Phytophthora*, and model of the development of the parasite. The contents of this study are as follows: the criteria of weather conditions favoring *Phytophthora*, a model of the development of the *Phytophthora*, analysis of the weather conditions with the air of the stand humidity rule, the test warning service of 1955 and 1956, and test parallel network for testing the warning forecasts by comparing biological and meteorological observation made simultaneously within the larger warning forecast area as exemplified by various areas in West Germany. *Subject Headings*: 1. Potato blight warning services 2. Potato blight forecasting 3. West Germany.—I.L.D.

10N-282

551.586:632.

U. S. Weather Bureau, *Weather and plant diseases*. U. S. Weather Bureau, *Daily Weather Map back*, May 14, 1953. 1 p. (fold.). photos, diagr. DWB—Review of the fight against mildew

type plant diseases, which can cause sudden damage up to 40 million dollars to tomatoes alone in the eastern United States, or cause famines due to potato damage in less developed countries. The efficiency of countermeasures depends largely on 5-day weather forecasts. Special agroclimatic studies are made in order to find the cause of the catastrophic epidemics. *Subject Headings:* 1. Mildew plant diseases 2. Climatic effects on mildew diseases 3. United States. I. U. S. Plant Disease Survey.—A. Assur.

10N-283

551.586:632.4:633.491

van Emden, J. H., *Waarnemingen betreffende het parasitisme van Pellicularia filamentosa* (Pat.) Rogers ten opzichte van de aardappelplant. [Observations regarding the parasitism of *Pellicularia filamentosa* (Pat.) Rogers with respect to the potato plant.] *Tijdschrift over Plantenziekten*, Wageningen, 64(3):276-281, 1958. figs., 6 refs. English and Dutch summaries p. 280-281. **DLC**—In the field it was noted that *Pellicularia filamentosa* often occurs on potato plants showing no symptoms of disease. If plants were found attacked, the lesions appeared only on stems and on stolons but not on roots. These observations led to experiments on potted plants and on sprouts growing on Knop-agar in the presence of *P. filamentosa*. It was found that potato plants can develop normally in soil infested with *P. filamentosa* if attack of stems and stolons could be prevented. *In vitro* rooted sprouts were always attacked through the stems or through the leaves, the roots remaining healthy as long as the stems remained alive. Light and temperature were important factors with regard to the resistance of the potato sprouts. In autumn, sprouts growing on agar and kept in a greenhouse at a temperature of about 20°C were infected within 7-10 days, but by artificial illumination this period could be extended to more than 4 weeks. In spring, with plenty of daylight, the plants were found to be highly resistant at a temperature of 15°C; infection was slight at 18°C and severe at 22°C. *Subject Headings:* 1. Fungus diseases of potatoes 2. Potatoes 3. Light effects on fungus diseases.—Author's abstract.

10N-284

551.586:635.25:632.4

van Doorn, A. M. (*Instituut voor Plantenziektenkundig Onderzoek (I.P.O.), Wageningen*), *Onderzoekingen over het optreden en de bestrijding van valse meeldauw (Peronospora Destructor) bij uien*. [Investigation of the occurrence and the control of downy mildew (*Peronospora destructor*) in onions.] *Tijdschrift over Plantenziekten*, Wageningen, 65(6):193-255, 1959. 5 figs., 4 plates, 15 tables, 28 refs. English summary p. 249-254. **DA, DLC**—The overwintering and further development of the disease caused by *Peronospora destructor* (Berk.) Casp. in onions are discussed. Results of a study of the relation between weather conditions and the occurrence of the disease are presented. All the data (light, temperature, humidity, wind, periods) and results of experiments are presented in tables. Field experiments investigated whether there is a relation between microclimatological data and the occurrence of downy mildew. Each day on which infection had most likely taken place had at least 11 hrs with a relative humidity of more than 95% at 0.10 m above the ground, or 90% at 2.20 m. This period was followed by at least 6 hrs with relative humidity of more than 80% at 0.10 m and 75% at 2.20 m above ground. *Subject Headings:* 1. Onion culture 2. Mildew plant diseases 3. Climatic effects on onion mildew.—A.V.

10N-285

551.586:581.2:635.28

van Hoof, H. A. (*Inst. voor Plantenziektenkundig Onderzoek, Wageningen*), *Oorzaak en bestrijding van de papiervlekkenziekte bij prei*. [Cause and control of white tip disease of leeks in the Netherlands.] *Tijdschrift over Plantenziekten*, Wageningen, 65(2):37-42, 1959. figs., 3 tables, 9 refs. Dutch and English summaries p. 42. **DA, DLC**—A species of *Phytophthora*, identical in general characteristics with *Phytophthora porri* (FOISTER, 1932), was isolated from diseased leaves of leeks in the Netherlands. However, the fungus differed from FOISTER's description in that no conidia were formed on the leaves, and those formed on oatmeal agar measured $38.2 \times 28.5 \mu$, in contrast to $51 \times 35 \mu$ measured by FOISTER. The minimum temperature for growth was just above 0°C, the optimum ranged from 12-22°C and the maximum was about 26°C. This again is not in agreement with FOISTER's findings. Spraying five times at 3-weekly intervals with CuOCl, captan and zineb gave fairly good control. *Subject Headings:* 1. Leeks culture 2. Fungus diseases of plants 3. Netherlands.—Author's abstract.

10N-286

51.506.8 551.586:632 551.586:551.571.36:551.579.2:632:633.11

Velikovský, V. and Krhouněk, S., *Výsledky měření v porostech ozimého žita při zjišťování vztahu mezi některými mikrometeorologickými faktory a rozvojem plísňové sněžné*. [Results of measurements made in winter wheat fields for the purpose of determining relationships between certain micrometeorological factors and the development of *Fusarium Nivale*.] *Meteorologické Zprávy*, Prague, 12(4):72-77, 1959. 6 figs., 6 refs. Russian summary p. 72; German summary p. 73. **DWB, DLC**. Also issued in: *Celostátní Bioklimatologická Konference, Liblice, 2d, Nov. 1958, Sborník Dokumentu*, pub. Prague, 1960, p. 269-274. 2 tables. German summary p. 274.—Micro-

meteorological conditions necessary for growth of snow mold (*Fusarium Nivale*) are examined. Results show that the following factors are most important: in summer, number of hrs with relative humidity over 90%; in winter, number of days with complete but melting snow cover. *Subject Headings*: 1. Micrometeorological effects on wheat diseases 2. Wheat diseases 7. Fungus diseases of wheat.—J. Némec.

10N-287

634.8:632.952:551.585

Vidal, J. P., (*Ecole Marocaine d'Agriculture de Meknès*), *La lutte contre le mildiou de la vigne* [Vineyard mildew protection.] *La Terre Marocaine*, Rabat, 31(No. 329):114-115, April 1957. **DLC**—Fungicide products used are usually efficacious but this efficiency is not only dependent on the product. The quantity of liquid employed per hectare, the pressure of spraying, and especially the date, and weather conditions prevailing during the treatments also influence the results. *Subject Headings*: 1. Vineyard diseases 2. Fungicides.—A.V.

10N-288

551.586:633.15:632.1

Volcani, Zafrira, A strain of *Erwinia carotovora* isolated from rotten maize plants. *Rehovot Israel. Agricultural Research Station, Ktavim. Records*, 8(3/4):217-219, Aug. 1958. 6 refs.—Infection experiments with *Erwinia carotovora* on corn plants showed that the bacterium produced soft rot of the stem when inoculated into the collar and stem, respectively, of very young corn plants under very humid conditions. The optimal temperature for infection was between 26°-28°C. No infection occurred at 37° and 5°C. Good infection was produced at 30° and 12°C. Slight infection was induced at 8°C. Infection was also produced on pepper and tomato plants and fruit of potato and carrot slices. *Subject Headings*: 1. Corn diseases 2. Bacterial diseases of corn 3. Humidity effects on bacteria 4. Temperature effects on bacteria.—A.V.

SPECIFIC CROPS

COFFEE

10N-289

551.578.7:633.73:632.16.3

Gaie, W. and Van Helmont, M., *Régénération rapide d'une jeune plantation de caféiers d'Arabie grâée*. [Rapid regeneration of a young plantation of Arabic coffee shrubs damaged by hail.] *Institut National pour l'Etude Agronomique du Congo Belge, Bulletin d'Information*, 7(6):385-387, Dec. 1958. 2 figs. **DLC**—Comments on the damage caused to a coffee plantation at Mulungu station by hailstones having on the average a diameter of 13-15 mm and sometimes more than 20 mm. The authors give the measures to be taken in order to regenerate a young plantation damaged by hail. *Subject Headings*: 1. Hail damage 2. Coffee plantations.—A.V.

10N-290

551.586:633.73

*Maganini, Ruth Lopes da Cruz (*Da Divisão de Geografia do C.N.G.*), *Condições climáticas das regiões cafeeiras do Brasil*. [Climatic conditions of the coffee regions of Brazil.] *Revista Brasileira de Geografia*, Rio de Janeiro, 18(3):422-438, July/Sept. 1956. 4 figs., 13 refs. **DWB** (M(05)R454b:)—Although the principal coffee growing regions of Brazil are in the states of São Paulo and Parana, there are several other areas in which coffee is grown under a great variety of natural conditions. Climatic normals (precipitation, temperature, frost, humidity, driest and wettest month) are tabulated for typical stations in each coffee growing region. Maps of Brazil showing the distribution of coffee production, phytoclimatic conditions, and climatic regions (KÖPPEN) are presented. Considering the great variety of climatic conditions to which coffee appears to adapt itself, the author concludes that the distribution of coffee production in Brazil is governed by economic rather than climatic factors, even though climate is a limiting factor in some areas, like northeastern Brazil with its high temperatures and extended drought periods. The effect of the quality of soil is also considered. *Subject Headings*: 1. Coffee cultivation climatology 2. Climatic normals 3. Brazil.—G.T.

10N-291

551.579:551.573:551.586:633.73(676.2)

Pereira, H. C., *The seasonal assessment of water needs in the irrigation of coffee*. *East African Agricultural Journal*, Kikuyu (Kenya), 22(4):188-191, April 1957. 2 figs., 2 tables, 4 refs. **DLC**—Taking different meteorological and vegetative factors into account, it has been possible to approximate the relation between open water evaporation rates, as measured by tanks, and the rate at which the coffee crop draws on the soil moisture supply. This affords a logical basis for controlling supplementary irrigation. *Subject Headings*: 1. Evaporation from water surfaces 2. Irrigation calculations 3. Coffee cultivation 4. Kenya.—A.V.

10N-292

551.586:551.506.8:633.73

Trojer, Hans, **La investigación agroclimatológica para el cultivo del café en Colombia.** [Agrometeorological investigation of coffee cultivation in Colombia.] *Centro Nacional de Investigaciones de Café, Chinchina, Colombia. Biblioteca, Boletín Informativo*, 7(75):78-101, March 1956. 5 figs., 1 table, 11 refs. **DWB**—A study concerned with the relation between weather conditions and the yield of the coffee plant in Chinchina and vicinity. Two well defined weather types are identified in the tropics: cyclonic (bad weather) and anticyclonic (clear weather). Weather conditions in Chinchina are characterized and related to the growth processes of the plant. It is noted that phenological observations are of help in the interpretation of the climatic conditions and zonification of a region where few meteorological data are available; and also that precise meteorological information is important in determining cultural practices where such information is available. *Subject Headings*: 1. Climatic effects on coffee plant yield 2. Coffee cultivation 3. Colombia.—E.Z.S.

CORN (MAIZE)

10N-293

551.586:633.15

Cauderon, A. (*Station d'Amélioration des Plantes, Clermont-Ferrand*), **Les maïs-hybrides en France. Étude de la précocité.** [Hybrid corn in France: study of early ripening.] *Paris. Institut National de la Recherche Agronomique, Annales, Ser. B, Annales de l'Amélioration des Plantes*, 8(3):273-289, July/Aug. 1958. fig., 3 graphs, tables, 4 refs. French, English, Russian and German summaries p. 287-289. **DA**—The factor restricting the extension of corn culture in France is the lack of warmth since the most important characteristic of a variety is its ripening date. Under these conditions, hybrids are cultivated which ripen just in time and which are most productive when the environmental conditions other than temperature are favorable. The best measure of early ripening is then the sum of temperatures (counted above a starting value of 6°C) from sowing to ripening. Maturity is recorded when grain moisture has decreased to 35%. The hybrids cultivated in France have been classified, according to this system, with reference to the international indexes of early ripening. The geographical distribution of the various groups of early ripening corn coincides well with the average temperature during the period May 1-Sept. 30, which is roughly the period favorable to corn in France. Some figures help to follow the evolution of corn culture in the various regions, over a few years: a clear extension is noted in the zones where the sum of temperatures above +6°C during the period favorable to corn growth is greater on an average, than 1600°C. Corn varieties showing an early ripening index of 300, intermediary between W. 240 and W. 355, mature uniformly in these regions. *Subject Headings*: 1. Corn cultivation 2. Climatic effects on corn ripening 3. France.—Author's abstract.

10N-294

551.573:581.11:633.15

†Pólya, L.; Katoma, E. and Styaszny, S., **Wasserverlust und Atmungsintensität von Maisblättern.** [Relation between the water loss in corn leaves and their respiration intensity.] *Debrecen, Hungary. Tudományegyetem, Acta Universitatis Debreciensis*, 4:183-194, 1957. Issued Budapest 1959. 10 figs., 35 refs. German summary. **DLC**—A study is made of the corn leaf respiration in relation to its water loss. The authors give a description of the method employed and of the measurements. A small water loss usually diminishes the respiration while a heavy loss increases the respiration. It is possible that both the increase of respiration and the beginning of damage caused by drought have a common cause: the diminution of concentration of phosphates, which are rich in energy and necessary for the structure of protoplasm. *Subject Headings*: 1. Transpiration of corn 2. Evapotranspiration from corn.—A.V.

10N-295

551.586:633.15

Chirkov, Iu. I., **Puti povysheniia ob "ektivnosti v otsenske sostoiianii posevov kukuruzy.** [Ways of increasing objectivity in determining the condition of young corn crops.] *Meteorologiya i Gidrologiya*, Leningrad, No. 1:3-9, 1958. fig., 3 tables, 6 refs., 3 eqs. **DWB, DLC**—The increase in the mass of plants corresponds to the compound interest law and the entire mass of plants is determined by the initial weight of the seeds, amount of growth in % per unit of time and duration of vegetation period. This can be expressed by an equation. Experimental data are presented on the effect of temperature and soil conditions upon mean daily growth in %. The application of a calculated curve constructed by means of this index, to evaluating quantitatively the growth and yield of corn is illustrated. From the curves illustrating the growth of the green mass of corn up to tasseling for different yields and climatic conditions, an equation is developed for expressing the weight of corn plants. The calculation of the correction measurement of the stalk, etc. is illustrated. *Subject Headings*: 1. Corn growth 2. Corn ecology.—I.L.D.

10N-296

551.506.8:551.524:633.15

Chirkov, Iu. I., **Znachenie ucheta listoobrazovaniia kukuruzy v agrometeoobslyuzhivaniia.** [The importance in agrometeorological service of calculating leaf formation in corn.] *Meteorologiya*

i Gidrologiia, Leningrad, 7:33-37, July 1957. fig., 6 tables, 10 refs. **DWB, DLC**—The results of an experimental study on leaf formation as an index of the relationship between temperature and growth and development in corn, indicates that (1) a relationship exists between early ripening and the number of leaves formed, (2) the rate of development of corn up to the tasseling is related to the tempo of leaf formation, (3) tempo of leaf formation is related to the air temperature and that (4) the sum of mean effective temperature of the interleaf periods is the same among different varieties of corn. The increase in mean total effective temperature from north to south is related to the increase in moisture deficit in the same direction. The mean total effective temperature required for the appearance of the leaf is calculated, and the relationship between mean daily air temperature and duration of interleaf periods is expressed by a formula. A formula is also given for determining the time of tasseling from each leaf that appears. Extensive numerical data are presented. *Subject Headings: 1. Leaf formation of corn 2. Temperature-leaf formation relationships 3. Temperature-corn development relationships 4. Corn phenology.—I.L.D.*

10N-297

551.573:581.11:633.15

Denmead, O. T. and Shaw, R. H. (both, *Iowa State Univ., Ames*), **Evapotranspiration in relation to the development of the corn crop**. Reprint from *Agronomy Journal*, Madison, Wisc., 51:725-726, 1959. fig., 7 refs. **DWB (M73 D397er)**—The corn crop in Iowa approaches the condition of a green crop, actively growing and completely shading the ground for a period of only 2-3 weeks during its growing season. In this period the ratio of evapotranspiration to open pan evaporation is 0.81. Before this period the ratio increases with increasing leaf area, and afterwards declines with declining physiological activity of the crop. *Subject Headings: 1. Evapotranspiration from corn 2. Corn 3. Iowa.—Authors' abstract.*

10N-298

551.586:551.524:633.15:581.144

Ingold, Marcel, **Le "cold test" appliqué à la germination des semences de maïs**. [The application of cold test to corn seeds.] *Annuaire Agricole de la Suisse*, Berne, N. S. 7(4):445-456, 1958. 5 figs., 17 refs. **DLC**—Experiments were carried out to extend culture in regions where this culture was not known before. Corn culture is sensitive to exterior unfavorable climatic conditions during the germination period. Different cold tests for corn are examined and compared with field emergence. The best results are obtained with the test in sand at 12°C during 7 days followed by alternating temperature 20-30°C during 7 days more. The combination of the results of the cold test and common germination test gives the "vigor index" which correlates well with the field emergence. *Subject Headings: 1. Corn climates 2. Temperature effects on corn.—A.V.*

10N-299

551.525.2:633.15

Ludwig, J. W. and Harper, John L., **The influence of the environment on seed and seedling-mortality**. *Plant and Soil*, The Hague, 10(1):37-48, 1958. 4 figs., table, 16 refs. **DLC**—Corn (variety White Horsetooth) was sown at depths of 2.5, 5, 7.5 and 10 cm in pot and field experiments and at 2.5, 5, 10 and 20 cm in field experiments. Ultimate % emergence and time for 50% emergence were determined, and soil temperature measurements were made. Emergence was reduced at all depths greater than 2.5 cm when soil moisture conditions were maintained near field capacity. However the optimal depth of sowing in the field may be 5 or even 10 cm during periods of drought. The relationship between soil temperature and depth are compared for field and pot conditions and the dangers of extrapolating from the pot to the field are emphasized. The factors which should be considered in deciding the depth at which corn should best be sown are discussed. *Subject Headings: 1. Soil temperature-sowing depth relationships 2. Corn sowing.—A.V.*

10N-300

551.524:633.15(497.2)

*Miteva, Ia., **Razvitiето na tsarevitsata pri temperaturnite usloviia na Dobrudzha**. [Cultivation of corn under the temperature conditions in Dobrudja.] *Khidrologiia i Meteorologiia*, Sofia, No. 2:71-83, 1957. 4 figs., 5 tables, 11 refs. Russian and English summaries p. 82-83. **DLC (Slavic)**—Experiments involving investigations of the development of several varieties of corn planted on different dates were conducted in 1954-1956 at the Dobrudja Scientific Institute. Data on daily and cumulative temperatures and on the dates of different stages of plant development are presented and optimum planting dates are derived. In general, temperature conditions in Dobrudja are found to be adequate for the normal ripening of corn. *Subject Headings: 1. Temperature effects on corn 2. Corn cultivation 3. Dobrudja, Bulgaria.—G.T.*

10N-301

551.577.38:633.15

†*Mota, Fernando Silveira da and Rosinha, Raul Colvara, **Ocorrência de seca no periodo critico do milho no Rio Grande do Sul**. [Occurrence of drought in the critical period of corn in Rio Grande do Sul.] *Pelotas, Rio Grande do Sul, Instituto Agronomico do Sul, Boletim Tecnico*, No. 12, Nov. 1955. 33 p. 5 figs., 4 tables, 27 refs. **DPU**—The frequency of drought (using Azzi's methodology) which was defined as a deficiency of 85 mm during the growing season for corn, was calculated from

available uniform records for Rio Grande do Sul, Brazil, and found to vary from 15% of the years in the NE interior (mountains) to >65% along the immediate coast as shown on map. Data and methods along with commentaries on local conditions, are presented. *Subject Headings:* 1. Drought frequency data 2. Agricultural ecology 3. Corn phenology 4. Rio Grande do Sul, Brazil. 1. Azzi, M.R.

10N-302

551.586:633.15:581.14

†Müller, H. W. and Schilowa, I., *Beiträge zur Maiszüchtung. Befruchtungsergebnisse nach künstlicher Bestäubung in Abhängigkeit vom Narbenalter und der Pollenlagerung bei verschiedener Temperatur und Luftfeuchtigkeit.* [Contribution to corn culture. Results of artificial fertilization in relation to pollen deposition under different temperature and moisture conditions.] *Der Züchter*, Berlin, 29(4):187-191, 1959. 2 figs., 5 tables, 24 refs. DA—Observations made between 1956-1958 have shown that the reproduction capacity of corn is conserved for a longer time under the climatic conditions of Central Germany than in the other corn cultivating countries. Corn pollen is highly sensitive and can only be conserved during 48 hrs in a moist place under normal temperature conditions. After 24 hrs in a temperature of 20°C and in dry air, the fertilizing capacity is largely diminished. The life power of pollen can be increased when conserved in a temperature of about 2°C, nevertheless its vitality does not last longer than 120 hrs. Germination in an artificial medium decreases but the tendency of continuous vitality loss follows a parallel evolution. *Subject Headings:* 1. Corn culture 2. Artificial fertilization of corn 3. Corn pollen deposition 4. Temperature effects on corn fertilization 5. Humidity effects on corn fertilization.—A.V.

10N-303

551.586:633.11:632.4

Ponchet, J. (*Station Centrale de Pathologie Végétale, Versailles*), *La maladie du piétin-verse des céréales (Cercospora herpotrichoides) Fron.* Importance agronomique, biologie, épiphytologie. [The disease of corn, *Cercospora herpotrichoides* Fron; agronomical importance, biology, epiphytology.] *Paris. Institut National de la Recherche Agronomique, Annales, Ser. C, Annales des Epiphyties*, 10(1):45-98, Jan./March 1959. 15 figs., 16 tables, 40 refs. DLC—The agronomical importance of this disease is shown by a study of the principal factors of corn yield in relation to the disease. The *Cercospora herpotrichoides* causes shriveling and decrease of ear fertility and, only occasionally, destruction of young tillers. Artificial inoculation was carried out in order to study the symptoms of the disease and to find the threshold of infection. It is most desirable to be able to predict the years in which this threshold will be exceeded, taking biological and meteorological data as a basis. The dissemination of the parasite takes place in two distinct ways: through rainfall and by aerial transport by wind. Once installed on its host, the parasite development is dependent on the temperature, if the environment is sufficiently humid. The threshold of its growth is approximately 0°C and at temperatures between 0° and 20° C its growth is proportional to the temperature. *Subject Headings:* 1. Fungus diseases of corn 2. Climatic effects on fungus diseases 3. Corn.—A.V.

10N-304

551.524.371:551.586:633.15

Schulze, J., *Die Kältetoleranz des Mais.* [Cold resistance of corn.] *Die Deutsche Landwirtschaft*, Berlin, 9(3):111-113, March 1958. 9 refs. DLC, CU—The cold resistance of corn depends essentially on the degree of ripeness and the condition of the kernels. Kernels weakened in vitality are easily attacked by mushrooms in a cold and wet soil. A good chemical treatment of corn increases resistance to cold, and keeps the germs from developing in the kernels thus protected. Examination of the resistance has been made by a special test; the technical details of this test are described. *Subject Headings:* 1. Cold resistance of corn 2. Corn.—A.V.

10N-305

551.506.8:633.15

Zelenova, N. E., *Fenologicheskaya s'emka srokov seva kukuruzy.* [The phenological survey of the sowing periods of corn.] *Vsesoiuznoe Geograficheskoe Obshchestvo, Leningrad, Izvestiya*, 91(2):204, March/April 1959. DWB, DLC—During 1954-55 the All Union Geographical Society carried out a survey to determine with what seasonal phenomena the annual sowing dates of corn correspond in the various regions. The phenological section of the Society carried out a more extensive survey on the phenology of corn sowing in European and Asiatic U.S.S.R. in 1958. The Phenology Section proposes to conduct such surveys every 4 yrs in order to obtain data for different kinds of spring weather. *Subject Headings:* 1. Corn phenology 2. U.S.S.R.—I.L.D.

COTTON

10N-306

633.511:551.577

Corcelle, P., *Influence de la pluviométrie sur la maturité des fibres de coton.* [Influence of rain on the ripening of cotton fibres.] *Coton et Fibres Tropicales*, Paris, 12(3):351-356, Dec. 1957.

fig., 2 tables, ref. **DLC**—The author shows the existence of a very close connection between the maturity of the fibers and the late rains of Oct. and Nov. For this purpose, he has calculated the correlation coefficient between two series of values obtained, i.e., on the one hand, the ratio of rainfall Oct. + Nov.

Annual amount' and on the other hand, the maturity of the fibers, expressed by the micronar index.

Subject Headings: 1. Cotton 2. Rainfall effects on cotton.—A.V.

10N-307

633.511:551.58

Demol, J. and Niclaes, J., **Contribution à l'étude des variations de la résistance de la fibre de coton en relation avec les facteurs du climat.** [Contribution to the study of cotton fiber resistance in relation to climatic factors.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 49(5):1291-1300, Oct. 1958. 2 figs., 7 tables, 4 refs. **DLC**—The northern cotton region of the Belgian Congo extends over various ecological media (equatorial and subtropical forests, savannas). This contribution is based on experiments carried out in these different media. The author establishes a comparative study of the fiber resistance of different varieties in various media and examines the influence of climatic factors on the fiber resistance. This study shows the favorable influence of luminosity and temperature and the unfavorable influence of heavy rains. The correlation which seems to exist between the period of heaviest rains during the capsular development and fiber resistance should permit the determination of technological qualities of the marketable cotton in a given region. *Subject Headings:* 1. Climatic effects on cotton fiber 2. Cotton fiber 3. Belgian Congo.—A.V.

10N-308

551.586:633.55

François, J., **Les relations thermiques de la germination chez diverses espèces du genre *Gossypium* L.** [The thermal relationships of germination for various species of *Gossypium* L.] *Académie Royale des Sciences Coloniales. Classe des Sciences Naturelles et Médicales, Mémoires*, N.S. 7(5), 1958. 91 p. 23 figs., 14 tables, 18 refs. **DWB, DLC** (Q111.B78)—Study of the comparative ecology of germination of various cultivated and wild species of cotton plants. Its purpose is to obtain a better knowledge of these plants, particularly the types cultivated in the Belgian Congo. The author discusses their intrinsic ecological properties and brings out new facts concerning their amelioration or adaptation to the milieu. He makes a study of the inhibition of seeds and the influence of light and temperature of the substratum on germination. *Subject Headings:* 1. Cotton ecology 2. Cotton seed germination.—A.V.

10N-309

551.579.5:628.1:633.55

Gerard, C. J.; Bloodworth, M. E.; Burleson, C. A. and Cowley, W. R., **Cotton irrigation in the lower Rio Grande Valley. Texas. Agricultural Experiment Station, College Station, Bulletin**, 916, Sept. 1958. 14 p. 9 figs., 13 tables, 10 refs. **DWB** (628.1 T355co)—Maximum growth and yield of cotton were obtained when the cotton crop was grown under a high level of moisture. Maximum demand for moisture by cotton plants started during the flowering period and increased until most of the bolls were mature. Addition of irrigation water during critical water demand periods of plant growth (during and after the bloom stage) increased cotton yields. Close spacings (6 in.) should be used where it is possible to maintain an ample supply of available soil moisture. Wider spacings (12 in.) may be considered where soil moisture may be limited during the peak demand periods in June and July. Tensiometer data and soil moisture sampling data indicated that the maximum use of moisture was from the upper 2 ft of soil on both Willacy loam and fine sandy loam soils. Proper timing in the irrigation of cotton to coincide with stages of maximum use and demand can reduce water use and produce higher yields. 80% or more of the cotton roots were found in the top 2 ft of soil. Irrigation schedules under a low and an adequate supply of water are proposed. These should help the Lower Rio Grande Valley farmer plan the irrigation of cotton according to his water supply. *Subject Headings:* 1. Soil moisture effects on cotton 2. Cotton production 3. Rio Grande Valley, U. S.—Authors' abstract.

10N-310

551.586:551.577:633.51

Leuwens, A., **Pluviométrie et culture cotonnière au Nord-Cameroun.** [Rainfall and cotton culture in North Cameroun.] *Coton et Fibres Tropicales*, Paris, 13(3):409-424, Dec. 1958. 4 tables, 7 refs. **DLC**—The rainfall in North Cameroun, irregular as to quantity and distribution, is closely related to the cotton crop through its direct influence on the sowing date, cultural practices and pests. After 10 yrs of records and experiments, an attempt has been made to determine for the various areas, the suitable sowing dates, cultural practices and pest control methods in relation to their rainfall patterns. *Subject Headings:* 1. Cotton climates 2. Rainfall effects on cotton 3. North Cameroun.—A.V.

10N-311

633.511:631.547.6:551.577

Lombard, P. and Boulet, L., *Bilan de cinq années d'irrigation sur le cotonnier au Maroc*. [Results of five years' irrigation of the cotton plant in Morocco.] *Coton et Fibres Tropicales, Paris*, 2(3):317-334, Dec. 1957. 9 figs., 8 tables. **DLC**—Account of the results obtained during 5 yrs of methodical irrigation tests carried out in the fields with laboratory control and using the modern techniques for the measurement of soil moisture. This study shows the efficiency of economical irrigation formulas both as regards the volume of any irrigation and the frequency of the sprayings, these being able to be reduced during spring to a 20-day periodicity. The irrigation of the cotton plant in Morocco may be done with a total water volume of the range of 6000-8000 m³/ha, when the classic norms take into account far greater volumes, of about 12,000 m³/ha. *Subject Headings*: 1. Irrigation experiments 2. Cotton fields 3. Morocco.—A.V.

10N-312

551.58:061:633.51(85)

Roldan Seminario, Ernesto, *El clima y el algodón*. [Pt. 1]. [Climate and cotton.] *Revista Meteorológica del Peru*, Lima, 2(3):22-24, Oct./Dec. 1956. tables. **DWB**—The Meteorological Service of Peru has a vital role in the cotton production of Peru and is recognized on the Committee for Defense of Peruvian Cotton, under the auspices of the National Agrarian Society. Cotton is one of the basic economic factors in Peru. Climatic data and forecasts are essential for cotton growers. An elaborate organization scheme for the Cotton Committee (Meteorological Division) is presented. A network of uniform climatic stations in the valleys of Peru is being set up by the Committee. *Subject Headings*: 1. Climate and cotton 2. Cotton regional networks 3. Peru.—M.R.

10N-313

551.577:633.51(543)

Sreenivasan, P. S. and Bannerjee, J. R. (both, *Mel. Office, Poona*), *A comparative study of rainfall and cotton crop under crop-weather scheme at Akola and Nagpur*. *Indian Journal of Meteorology and Geophysics*, 9(2):151-160, April 1958. 3 figs., 3 tables, 4 refs. **DWB, DLC**—The results of crop weather studies of 2 varieties of cotton, grown at Akola and Nagpur, India, are reported. The behavior of the crop at these two stations was first studied by the analysis of variance method. The differential behavior of the crop was then examined taking into consideration the rainfall during the various phases of the crop. Six years' data are used. Results indicate that there are certain critical phases of crop development during which weather has a great influence. *Subject Headings*: 1. Rainfall effects on cotton 2. Cotton 3. Cotton climates 4. Akola, India 5. Nagpur, India.—N.N.

10N-314

551.571:633.51

Wooten, O. B. and Montgomery, R. A. (both, *Delta Branch Ex. Station, Stoneville, Miss.*), *Effects of relative humidity and spindle moisture on machine picked cotton*. *Mississippi Agricultural Experiment Station, State College, Circular*, No. 204, April 1956. 7 p. 2 figs. **DWB**—Analysis and interpretation of data obtained through picking tests at hourly intervals from 6 a.m.-5 p.m. show that relative humidity may serve as a guide to satisfactory cotton picking. The tests included hand picking as well as spindle type pickers for which comparisons are presented graphically along with temperature, relative humidity, field seed cotton moisture and spindle moisture. *Subject Headings*: 1. Cotton picking 2. Humidity effects on cotton picking.—W.N.

FLOWERS

10N-315

551.506.8:582.931

Caprio, Joseph M. (*Agricultural Experiment Station, Montana State College*), *Phenology of lilac bloom in Montana*. *Science*, Wash., D. C., 126(3287):1344-1345, Dec. 27, 1957. fig. **DLC**—Lilac bloom survey in Montana during the spring of 1956 provided useful information about the climate and plant development in the state. Analysis showed that latitude and elevation correlate significantly with dates of lilac bloom; and the season is retarded 1 day for every 20 mi of distance northward. Further information will help observers to determine the relation between weather and plant development. *Subject Headings*: 1. Lilac bloom phenology 2. Montana.—N.N.

10N-316

551.586:551.521.16 633.3

Joffe, A. (*Division of Crops and Pastures, Dept. of Agriculture, Pretoria*), *The effect of photoperiod and temperature on the growth and flowering of birdsfoot trefoil, Lotus corniculatus L.* *South African Journal of Agricultural Science*, Pretoria, 1(4):435-450, Dec. 1958. figs., 2 plates, 8 tables, 16 refs. English, Afrikaans and French summaries. **DLC**—*Lotus corniculatus* was found to be a long-day plant in which the quantitative reaction to photoperiod occurred over relatively wide limits. A day length of approximately 16 hrs was required before flowering was initiated. At 15 hrs the number, rate and degree of development of floral primordia were restricted. At a day length of 14 hrs abortive buds were formed almost exclusively. This also applied to plants which

received a suboptimum number of long duration light cycles. However, the appearance of abortive inflorescences was characteristic of this species even under apparently optimum photoinductive conditions. Factors which influenced the percentage of defective inflorescences were night temperature, light conditions and possibly the nitrogen level of the plants. Lotus exhibited virtually no photoinductive after-effect of long days, the initiation of floral primordia ceasing upon exposure to short days. Under the influence of long days, flowering appeared to occur in "flushes." Plants grown in temperature controlled greenhouses exhibited significant deviations in floral and vegetative characteristics in comparison with plants kept outdoors for 8.5 hrs each day. This is ascribed mainly to differences in the light environment. There was little effect of temperature on the rate of production of normal inflorescences within the temperature ranges studied. Plants kept under short-day conditions showed a rosette type of prostrate growth compared with the erect, flowering long-day plants. *Subject Headings:* 1. Birdsfoot trefoil 2. Climatic effects on birdsfoot trefoil 3. Photoperiodism.—*Author's abstract.*

10N-317

551.524:581.5:582.998 535:581.5

Rafols, Wilfredo de, *Experiencias ecológicas sobre el T. kok-saghyz* Rodin: Foto y termoperiodicidad. Pt. 1, Morfología externa. [Ecological experiments on *Taraxacum kok-saghyz* Rodin: photo and thermoperiodicity. Pt. 1, External morphology.] Spain. Instituto Nacional de Investigaciones Agronómicas, *Anales*, 2(1):1-52, 1953. 50 figs. (incl. photos), 15 refs. Spanish and English summaries p. 50-51. **DLC**—The relationship between temperature and light in the growth and development of *Taraxacum kok-saghyz* was studied experimentally under controlled laboratory conditions. The growth under constant temperature under artificial light; the response of plants to light intensity under variable temperatures; the influence of temperature with natural light and in darkness, etc. were investigated. The general development of the plants was better with low night temperatures and longer exposures to daylight. *Subject Headings:* 1. Dandelions 2. Temperature effects on dandelions 3. Light intensity effects on dandelions.—*I.L.D.*

10N-318

551.586:582.734

Robb, A. D. (State Climatologist, U. S. W. B., Topeka, Kans.), *Rose culture and the weather* U. S. Weather Bureau, *Weekly Weather and Crop Bulletin*, 47(2):8, Jan. 11, 1960. 7 refs. **DWB** **DLC**—The most favorable weather factors for rose production are ample rainfall and moderate temperatures. Roses also respond favorably to needed alterations of nature's weather by various practices as irrigation or greenhouse heat. Extremes of heat in summer, especially coupled with intense sunshine, cause a decline in flowering. Severe winter cold has damaging effect. Too much rain with poor drainage is also detrimental. *Subject Headings:* 1. Meteorological effects on rose culture 2. Rose culture.—*I.S.*

10N-319

551.506.8:581.1

Rosenkranz, Friedrich, *Ein Beitrag zur Phänologie der Biennahrpflanzen*. [A contribution to the phenology of plants providing food for honeybees.] *Wetter und Leben*, Vienna, 5(3/4):62-66, June 1954. The phenology of *Robinia pseudacacia* in lower Austria is analyzed. A map showing the period of onset of blossoming of *Robinia* is presented. The dependence of blossoming phases of *Robinia* upon weather and the relation to the blossoming of the cherry are discussed. *Subject Headings:* 1. Acacia blossom phenology 2. Austria.—*I.L.D.*

10N-320

551.586:635:582.59

Vacin, Emil F., VII. The development of a cymbidium compost. *Cymbidium Society News*, Pasadena, California, 7(4):18-29, April 1952. 4 figs., 3 tables. **DWB**—Some 4-yr means, 1937-1940, of temperature, rainfall and relative humidity at Chiangmai, Thailand and Hon-ba and Dalat, in Annam, French Indochina, are briefly cited as representative of climatic conditions favorable to natural growth of the cymbidium (orchid). Article deals with growth and flowering of the plant in general, including as one of the considerations, climatic conditions, not just the climate of Southeast Asia or of any other place in particular. *Subject Headings:* 1. Orchid climate 2. Thailand 3. French Indochina.—*H.K.G.*

10N-321

551.586:551.524.37:633

Wellensiek, S. J., *Vernalization and age in Lunaria biennis*. *Akademie van Wetenschappen, Amsterdam. Afdeling voor de Wis- en Natuurkundige Wetenschappen, Proceedings, Ser. C*, 61(5):561-571, 1958. 3 figs., 7 tables, 6 refs. **DLC**—The scope of this paper is the study of a) the relation between the age of the plants and the duration of the cold treatment; b) the effect of seed vernalization; and c) the effect of giberellins. The results show: 1) *Lunaria biennis* is a biennial plant requiring cold. At 6-8° both vernalization and flower formation take place, followed by complete flowering, provided the plants are adult upon being exposed to the low temperature. 2) In the transition stage between juvenile and adult phase, the percentage of flowering increases, and the time required for

induction decreases with increasing age. 3) Seed vernalization does not lead to complete induction, but interacts with plant vernalization. This may lead to more complete and more rapid flowering, when plant vernalization has a suboptimal result owing to age of plants or too short a cold treatment. It is argued that *Lunaria biennis* has no qualitative juvenile phase for cold induction, but that the available quantity of substrate is the limiting factor for complete induction. The juvenile phase for vernalization is the period during which the induction has not yet been completed. 5) Gibberellin does not influence flower formation in *Lunaria biennis*. *Subject Headings: 1. Honesty 2. Vernalization 3. Low temperature effects on plants.—A.V. and author's abstract.*

FODDER

10N-322

551.586:551.521.18:633.2

de Lint, P. J. A. L. (Lab. for Plant Physiol. Res., Agric. Univ., Wageningen, Netherlands), *Double action of near infrared in length growth of the Avena coleoptile. Wageningen. Landbouwhogeschool, Mededelingen*, 57(10), 1957. 9 pages, 3 figs., 10 tables, 12 refs. Summary p. 9. **DLC**—*Avena coleoptile's* growth is affected by light; all wavelength regions appear to be inhibitive, including near infrared. Besides this, near infrared has a de-inhibition capacity on inhibiting effects induced by a preceding irradiation in the blue, yellow or red wavelength regions. This reaction takes place only when a certain inhibition has been induced, but not yet fixed, i.e., has not yet proceeded beyond a certain degree. The functional system may be an inhibitor of length growth by visible light and destroyed by near infrared radiation. *Subject Headings: 1. Grasses 2. Light effects on grasses.—Author's abstract.*

10N-323

551.586:633.2 551.577:631.55

Dightman, R. A. (U. S. W. B., Helena, Mont.), *An application of climatology to alfalfa harvesting. U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 46(28):8, July 13, 1959. fig., 3 refs. **DWB, DLC**—By controlling the date that the alfalfa reaches the optimum cutting date, it is possible to reduce the rain damage to hay quality. In this paper a technique that has been successfully used in Missoula County, Mont., is described. Maturity may be delayed by grazing, or clipping with a mower to use for feeding or silage. Chance of 5 successive days without .05" or more rain is twice as great on July 25 as during June, and the 1-day chance is 3 times as great on July 25 as on June 1, as shown in 2 curves for Missoula, Montana based on a 65 year record (June 1–Sept. 29). *Subject Headings: 1. Agricultural climatology 2. Alfalfa harvesting 3. Rainfall probability and hay 4. Montana.—N.N. and M.R.*

10N-324

551.586:633.2

*Harper, Horace J., *Effects of fertilization and climatic conditions on prairie hay. Oklahoma. Agriculture Experiment Station, Bulletin*, No. B-492, June 1957. 23 p. 2 figs., 11 tables. **DWB** (M86:633 H294bu)—In a study of the effect of 18 yrs of continuous fertilization on yields and composition of prairie hay (1929–46) it was found that the rainfall distribution and amount from April 1 to harvest had a very significant effect on yields and on response to nitrogen fertilizers. Nitrogen, phosphorus and calcium content of the hay decreases with increasing rainfall during period Jan. 1 to harvest date, as shown by analysis. A summary of monthly rainfall data at the Stillwater Okla. Agronomy Farm for 1929–1951 is given in a table and used in correlations. Three periods were tested: Nov. 1 to harvest, Jan. 1 and April 1 to harvest. Some factors correlate best with one and some with another of these periods, depending on whether fall, winter or spring precipitation is most important. *Subject Headings: 1. Precipitation effects on hay yield 2. Precipitation effects on fertilizer 3. Hay 4. Stillwater, Okla.—M.R.*

10N-325

551.586:633.2/3:581.14.05

Lecourt, Bernard, *Comportement des plantes fourragères vivaces en fonction du lieu. [Behavior of perennial fodder plants with respect to site.] La Terre Marocaine*, Rabat, 31(No. 329):99–110, April 1957. 7 photos.—The climatic complex influences the adaptation of species. Resistance to cold, resistance to drought, need of water, nature and structure of soils influence to a great extent the behavior of the various species of perennial fodder plants. The author examines the behavior of 14 different species, studying especially the influence of the climate of soils. *Subject Headings: 1. Fodder plants 2. Soil climate effects on fodder plants 3. Climatic effects on fodder plants.—A.V.*

10N-326

551.577:551.579.5:633.3(943)

Nagle, A., *Big fodder yields from small water supplies. Queensland Agricultural Journal*, Brisbane, 85(7):426–428, July 1959. photo. **DLC, DA**—Data are given on the yield of perennial, annual and summer fodder crops under irrigation and supplementary moisture stored in fallows in Queensland. Under the conditions at Biloela and Gatton, 24–40 in. of irrigation water in addition to the 26–28 in. rainfall give an annual yield of 7½–10 tons of lucerne hay an acre; irrigated pastures

give up to 40 tons of green material an acre. In less favored areas of Queensland studies were made on annual crops and summer crops. These studies have shown that one 2 in. irrigation or thereabouts when the crops are about to suffer from water shortage and 0-1 in. of rain during the effective growing period are usually sufficient to ensure a good yield. It must be noted, however, that moisture stored in fallows amounts to another 2 or 3 in. *Subject Headings:* 1. Soil moisture requirements of fodder crops 2. Fodder crops 3. Queensland, Australia.—A.V.

10N-327

551.58:633.7

Riewe, M. E. and Smith, J. C., *Performance of perennial warm-season grasses at Angleton 1956. Texas. Agricultural Experiment Station, College Station, Progress Report, 1949, April 23, 1957. 3 p. 3 tables. DWB (630.61 T355p)*—This report gives air-dry forage yields for 12 perennial warm season grasses at Angleton in 1956. It is found that good forage yields are possible in years with subnormal rainfall provided adequate fertilizer is applied. *Subject Headings:* 1. Climate and crop yield 2. Forage crops 3. Angleton, Tex.—*From authors' abstract.*

10N-328

551.586:551.524.36:551.578.46:633.7

†Schulze, E. and Sommerfeldt, H., *Zur Saatzeit der Luzerne.* [On the time for sowing lucerne. *Zeitschrift für Acker- und Pflanzenbau*, Berlin, 105(4):377-394, April 1958. 5 graphs, 7 tables, 38 refs. English and German summaries p. 390-392. *DLC*—Extensive research from 1953-1955 into the time for sowing lucerne, in field experiments at Bonn-Poppelsdorf, gave significant results. Duration of germination, brairding and take were determined less by soil conditions at seeding time than by the weather immediately after sowing. Weakly developed lucerne growing on into the winter, from autumn and prewinter sowings, succumbed to the inclement weather; dry or only swollen seeds were not damaged by sharp frosts, but on the contrary, brairding was accelerated when the temperature rose again. A covering of snow sheltered the recent sowings from heavy frost, but left the young seedlings without any protection. Late spring droughts caused particular damage to the April and May sowings, but not to the Jan., Feb. and March sowings, since these obtain their requirements from the winter reserves. Seed sown in the first quarter of the year showed a marked superiority in yield over sowings in April and May. Autumn sowings in Sept. and Oct. yielded considerably less than Aug. sowings. January sowings however cannot generally be recommended, in years when a warm period follows a frost and encourages premature brairding, only to be followed by a period of intense cold. *Subject Headings:* 1. Climatic effects of lucerne cultivation 2. Lucerne cultivation 3. Bonn, Germany.—A.V.

10N-329

551.586:551.524:664.8

Wieringa, G. W. (*Inst. for Storage and Processing of Agricultural Produce, Wageningen*), *Some factors affecting silage fermentation, Pt. 1, Influence of laceration and storage temperature.* *Netherlands Journal of Agricultural Science*, Wageningen, 7(2):134-137, May 1959. 4 figs., table, 6 refs. *DA*—Laboratory-scale ensiling experiments demonstrated that the laceration of grass stimulates bacterial development. The enhanced growth rate of the lactic acid bacteria results in a more rapid fall of the pH, and consequently in better preservation of the crushed grass. It was possible to establish that this growth promoting effect is caused by the liberation of sugars from the bruised grass cells. Emphasis is laid on the necessity of wilting or using additives when ensiling crops poor in sugars. A low storage temperature proved to be equally important for the course of the fermentation of both lacerated and untreated grass silages. At a silage temperature of 30°C the effect of crushing was nullified by the optimal development of the butyric acid bacteria. *Subject Headings:* 1. Grass silage 2. Silage fermentation 3. Temperature effects on silage fermentation.—*Author's abstract.*

ORCHARDS

Orchards (General)

10N-330

551.579.5:626.862:634

Braams, B. W. and Butijn, J., *Drainage in de fruitteelt.* [Drainage in fruit culture.] *Netherlands. Directie van de Landbouw, Mededelingen [van de] Directeur van de Tuinbouw*, The Hague, 21(11):763-770, Nov. 1958. 3 photos, 3 tables. Dutch and English summary p. 769-770. *DLC*—As a result of experiments and observations a few criteria of drainage systems have been laid down for fruit culture. A rough distinction is made here as to the type of soil. Circumstances are considered which may be of importance in making tile drainage systems according to these criteria. In particular, the soil permeability, the desired drainage depth and a number of factors of a technical nature determine how a system must be constructed. The question is also considered of the desirability of deep or shallow drainage. The crop requirements and the possibilities of construction play a part in this. Pedological profile research gives data which are also valuable for planning

o good drainage system. To determine the tile spacing, measurements of the permeability of the soil must also be made. It is suggested that in orchards, drainage should be adapted to the planting layout and that the tile distance should be rounded off to a multiple of the distance between the rows. An advantage of this is that the divergent hydrological qualities of the soil can be incorporated in a scheme. Tile distances of 4-6 times the distances between the rows are found in soils which are very permeable and often susceptible to dryness. In the best soils the tile distance will generally be 2 or 3 times the distance between the rows, at any rate when this distance is 4-5 m. Tile distances smaller than 8 m are found in soils with low permeability. Much use is made in these soils of vigorous root stocks. *Subject Headings: 1. Fruit culture 2. Orchards 3. Soil moisture 4. Soil permeability 5. Drainage planning.—Authors' abstract.*

10N-331

551.509.62:634

†Clendenin, John Donald, *Frost-control practices and the prospective use of anthracite*. U. S. Bureau of Mines, *Information Circular* No. 7714, July 1955. 45 p. 4 figs. (incl. photos), 3 tables, 60 refs. DWB—An intensive study was made, and is reported, of various methods of frost control in orchards in the several fruit growing regions of the U. S., for the purpose of determining the possibility of the use of anthracite coal for orchard heating. It was found that coal heaters are being used less and less, although tests show that by alternating coal and oil heaters an appreciable economy could be effected under stable freezing conditions. Coal does not allow the flexibility of control that oil does, since it takes longer to heat up and the amount of heat cannot be intensified nor can it be put out when no longer needed. In areas such as Washington State where the value of the crop per acre is nearly \$1000, heating is on the increase. In citrus areas where the crop is only worth half as much, heating is not as economical. *Subject Headings: 1. Frost protection methods 2. Orchard heating 3. United States.—M.R.*

10N-332

551.524.371:632.111.5:634

de Villiers, G. D. B. (*W. P. Fruit Research Station, Stellenbosch*), *Frost in the Western Province: damage can be prevented to a large extent*. *Farming in South Africa*, Pretoria, 35(9):39-41, Dec. 1959. photo. DLC—Various ways to prevent frost damage in spring are shown to the deciduous fruit farmers in the winter rainfall region of South Africa. These include: 1) avoiding frost hollows by draining cold air; 2) applying sound orchard practices during the danger period, giving attention to soil types; 3) planting late fruit varieties; 4) creating smoke clouds in the event of light frost (1-2°C), provided there is no wind and the smoke cloud covers a large area; 5) heating orchards by oil heaters where severe frost occurs; 6) spray irrigation at a rate of 3 to 5 mm/hr during the whole critical temperature period. The last method is the most effective. *Subject Headings: 1. Frost protection of orchards 2. Late spring frosts 3. South Africa.—A.V.*

10N-333

551.524:634

de Villiers, G. D. B. (*Western Province Fruit Research Station, Stellenbosch, South Africa*), *Temperature in relation to the winter rest of deciduous fruit trees*. *Deciduous Fruit Grower*, Cape-town, 2(6), June 1952. [3 p.] graph, 2 refs. Abstracted from reprint.—Deciduous fruit trees require chilling weather during the winter for normal development. So plum production and exports decrease with high winter temperatures. Average temperatures for June-July of the fruit growing areas of the Western Cape Province are listed. *Subject Headings: 1. Fruit trees 2. Temperature effects on fruit trees 3. Cape Province, South Africa.—A. Assur.*

10N-334

551.509.612:551.524.37:632.111.5

Frost protection pointers. A revised list of timely suggestions compiled from information supplied by the Agricultural Extension Service. *California Citrograph*, Los Angeles, 39(1):28-29, Nov. 1952. DWB—Information about the Fruit Frost Service of the U. S. Weather Bureau and the basic ideas discovered by the workers with respect to relation of wind, temperature, etc. to freezing in orchards and prevention of freezing. A large number of small fires is said to be better than a small number of large ones. *Subject Headings: 1. Fruit Frost Service 2. Frost protection of orchards 3. Freezing damage prevention 4. Orchards.—M.R.*

10N-335

551.588.2:551.524.37:634:632.11:632.961

Geslin, H., *Situations gélives*. [Frost situations.] *France. Ministère d'Agriculture, Bulletin Technique d'Information des Ingénieurs des Services Agricoles*, No. 135:599-608, Nov./Dec. 1958. 14 figs., 3 refs.—Mention of the radiation phenomena and general conditions of heating and cooling in the neighborhood of soil, that constitute the origin of frost formation. Studies the influence of relief, and especially of microrelief, which is decisive in giving to spring and autumn frosts their essentially local character, and examines the influence of soil cultivation and plant cover on the local increase of frost risk. In his conclusions, the author lays out the rules to be observed in the choice of site for planting an orchard and indicates the cultural methods which have to be applied.

Subject Headings: 1. Frost hazard data 2. Late spring frosts 3. Frost protection of orchards 4. Orchards.—A.V.

10N-336

551.556.1:634:632.117:581.43

Iizuka, I. (*Faculty of Education, Ehime Univ.*), **The relation of mechanical property of fruit tree leaves and shoots to wind injury.** *Journal of Agricultural Meteorology*, Tokyo, 14(1):27-30, July 1958. 4 tables. In Japanese; English summary p. 30. DWB—These experiments were conducted using Japanese pear, peach, apple, Iyo-orange, chestnut, persimmon, and fig trees, to investigate the relationship between the mechanical strength of their leaves and wind injury. The results were summarized as follows: 1) The elasticity of the shoot of the fruit trees was greater in the following order: fig, apple, peach, Iyo-orange, chestnut, Japanese pear, and persimmon. Also, it was observed that elasticity became less in proportion to the distance from the base of the shoot. 2) The ultimate strength of a petiole was indicated by the force at the moment when the petiole began to be torn from the shoot. As to the direction of the force, this strength was weakest when it acted towards the basal direction, but strongest towards the apical one. It was stronger in the case where the force acted radially in the right angle towards the shoot than in that of the tangential, with a few exceptions. And also it was strongest in the fig tree, but very weak in the peach and the apple trees. Moreover, it was stronger at the middle part of the shoot than at the apical or at the basal part. The strength seems to be related to the area and the shape of the basal end of the petiole, the arrangement of vascular bundle at the same part, and the angle between the shoot and the petiole. 3) The possible degree amount of bending in the petiole was indicated by the angle at the moment when the petiole began to break from the bending. It was largest in the fig tree but smallest in the persimmon. These facts seem to be related not only to the tensile strength of the bast fibers but also to the position of bast fibers around the wood fibers. 4) The tensile strength of laminae in the Iyo-orange and the fig tree was very strong, but those of the peach and the apple tree weak. 5) The experiment was made of measuring the resistance of detached and intact leaves to the wind which was blown at a velocity of 20 m/s by a blower. Large detached leaves such as those of the fig and the persimmon showed stronger resistance to the wind in leaf oscillation than that of the small ones such as the Iyo-orange or the apple. The intact leaf indicated the same tendency of resistance to the wind as that of the detached one. However, the intact leaves of these such as the pear or the apple, which have long but fine petioles, resisted more strongly more oscillations than the detached ones did. In the case of large leaves, both margins rolled like cylinders and consequently the oscillation was reduced. Thus the leaf margins suffered light abrasion in the fig and the persimmon trees, and the leaf tips were cut off in peach trees. 6) The wind injury of the fruit tree leaves seems to increase remarkably not only when the shoot's elastic force which acts to return the shoot towards windward, was added to the wind force which acts to push the leaves towards the leeward, but also when the direction of the wind agrees with that of the force which pulls the petiole towards the shoot base. **Subject Headings:** 1. Wind effects on fruit trees.—*Author's summary.*

10N-337

551.584.31:634.4

Minář, Miroslav, **Inverse teploty a mrazové kotliny s hlediska ovocnářského.** [Temperature inversions and frost pools from the point of view of fruit growing.] *Meteorologické Zprávy*, Prague, 5(2):41-44, 1952. 5 figs., table, 7 refs. DLC—General discussion of thermal conditions in depressions of the soil or enclosed slopes during frost situations; illustrated with sample data and schematic diagrams. **Subject Headings:** 1. Temperature inversions 2. Fruit culture 3. Frost pockets.—G.T.

10N-338

551.524.36:551.506.8:634.11(814)

†Mota, Fernando Silveira da (*Climatology Section, Instituto Agronomico do Sul*), **Os invernos de Pelotas, RS, em relação as exigências das arvores frutíferas de folhas caducas.** [Winters in Pelotas, Rio Grande do Sul, in relation to the needs of deciduous fruit trees.] *Pelotas, Rio Grande do Sul, Brazil Instituto Agronomico do Sul, Boletim Tecnico*, No. 18, May 1957. 38 p. 7 figs., 15 tables, 55 refs. DWB (M:63 R585bo)—A detailed statistical analysis of temperature data for Porto Alegre and Pelotas, Rio Grande do Sul, Brazil, to show the frequency of temperatures <7°C, which are considered to be conducive to retardation of apples. Diurnal, monthly, year-to-year, and duration frequencies are tabulated and shown graphically for April-Oct. Difference between observed values and those calculated from the regression formula. Phenological data for 31 types of apples are also tabulated for 1942 and 1943. Temperatures during the 10 days before floration, during floration, etc. are also tabulated and compiled with phenological data. **Subject Headings:** 1. Hibernation of fruit trees 2. Cold duration frequencies 3. Rio Grande do Sul, Brazil.—M.R.

10N-339

551.584.4:577.4:634(434.2)

Seemann, J. and Caspar, H., **Ein Beitrag zur Ökologie des Obstanbaugebietes um Meckenheim bei Bonn.** [Ecology of fruit culture around Meckenheim near Bonn.] *Die Gartenbauwissenschaft*,

München, 22(4):173-190, 1957. 8 figs., 10 tables, 6 refs. DA, DWB—Description of the place and the soil. A climatological station was established at Kl. Altendorf to obtain some information concerning the microclimate of fruit culture around Meckenheim. The results concerning radiation, wind direction, highest and lowest temperatures, soil temperature and rainfall are mentioned. These different meteorological elements are compared with those of Bonn; a brief study of microclimate terminates this contribution. *Subject Headings:* 1. Fruit culture ecology 2. Orchard microclimatology 3. Meckenheim, Germany.—A.V.

10N-340

551.582.2:551.524.36:632.111.5(493)

Vandenplas, A., *Les gelées printanières et la culture fruitière en Belgique*. [Spring frosts and fruit farming in Belgium.] *Le Fruit Belge*, Liège, 27(211):36-48, March 1959. DA—In Belgium, frost protection is of primary importance in fruit culture, and the period from March 21-April 10 is particularly critical. Analysis of frost risks during spring, in the Belgian regions devoted to fruit farming is presented. Mean climatological data for the months March, April and May; frequencies of spring frosts observed after March 21, from 1901-1957, and mean dates of the last frosts are given. Table of spring frost frequencies shows that, generally, the number of frosts occurring after a certain date decreases very rapidly in the course of April. Duration of frosts is significantly shorter after April 10. Short survey of radiation phenomena, general conditions of rise and fall in temperature, and account of influence of general atmospheric conditions on the radiation phenomena are included. Influence of humidity of air, cloudiness, wind, nature and cover of soil on frost risks are successively examined. *Subject Headings:* 1. Frost hazard data 2. Fruit culture 3. Late spring frosts 4. Belgium.—A.V.

Apples

10N-341

631.95:634.11:551.58

Remy, P., *Le choix des variétés de pommiers en fonction du milieu*. [Choice of apple tree varieties according to the milieu.] *France. Ministère d'Agriculture, Bulletin Technique d'Information des Ingénieurs des Services Agricoles*, No. 135:627-632, Nov.-Dec. 1958. The success of an orchard depends to a great extent on the judicious choice of varieties. This choice is a function of the economic data as well as of the milieu of the orchard. Examination is made of the influence of the milieu including soil, climate and, to a certain extent, parasites, three factors which interact simultaneously, but which are studied successively by the author. The climatic factors affect the density of flowering, the importance of fruit yield, the aspect of fruit (volume and color), their qualities and their conservation. *Subject Headings:* 1. Apple orchards 2. Climatic effects on apple orchards.—A.V.

10N-342

551.586:634.11:581.14

Stenz, S., *Die Größenveränderung der Früchte von zwei Apfelsorten (Borkh) in Zusammenhang mit meteorologischen Umweltbedingungen*. [Changes in thickness of two apple varieties (Borkh) in relation to the meteorological conditions of the milieu [Pt. 1].] *Schweizerische Zeitschrift für Obst Und Weinbau*, Wädenswil, 68(11):267-270, 1959. [Pt. 2, *Ibid.*, 68(12):285-290, 1959. DA—The author describes an apparatus which he has constructed for a continuous recording of the growth of apples. Comparison of the recordings with meteorological data reveals that apples grow and decrease in size almost entirely in proportion to the amount of air humidity; the critical threshold of relative humidity is 74%. *Subject Headings:* 1. Apple orchards 2. Meteorological effects on apple growth 3. Humidity effects on apple growth.—A.V.

Apricots

10N-343

551.586:634.21

de Villiers, G. D. B. (Western Province (Fruit Research Station, Stellenbosch), *Effect of summer climate on apricot production*. *South Africa. Dept. of Agriculture, Science Bulletin*, No. 363; 1956. 14 p. 3 figs., 3 tables, 11 refs. (Fruit Research Technical Series, No. 40.) DWB—This study deals with the climatic factors that may influence apricot production in South Africa, especially the effect of summer climate upon yield. The author discusses the climatic conditions under which apricots are grown, and data are given on: the mean monthly temperatures of areas where apricots are grown; the climatic requirements; the effect on apricot production of insufficient cold during winter, of unsettled weather conditions during blossoming and setting, of weather conditions during fruit development and of climatic factors at the time of fruit budding, differentiation and bud development; the role of annual rainfall irrigation; and the importance of soil moisture during the dry summer months. *Subject Headings:* 1. Apricot culture 2. Climatic effects on apricots 3. South Africa.—I.L.D.

10N-344

551.586:551.524.36:634.21:632.1111

†Wurgler, W. and Staehelin, M., *Contribution à l'étude du dépérissement de l'abricotier*. [Contribution to the study of apricot dieback.] *Annuaire Agricole de la Suisse*, Berne, N.S., 7(4):509-525, 1958. 11 figs., 57 refs. **DLC**—The authors describe the prevailing climate in winter in Valais studying the effects of frost on apricot dieback. They successively examine the effects of early frost on the young twigs, the buds and young fruit and on the cutting wounds. The damage due to these agents and the various parasites is primarily a tissue necrosis. The gummed tissue contained in the callus which is formed around the necrotic areas may modify the activity of cambium and the growth of next year's ring. It contributes to the creation of cankers, which cause the dieback of branches or entire trees. *Subject Headings: 1. Apricot diseases 2. Frost on apricot dieback 3. Valais, Switzerland.—A.V.*

Cherries

10N-345

551.506.8(541.42):634.23(52)

Fushiki, Japan. Weather Station, *On the relation between cherry blooming day and weather elements at Fushiki*. *Journal of Meteorological Research*, Tokyo, 5(3):147-158, March 1953. 6 figs., 12 tables. In Japanese; English summary p. 147.—The authors undertook a minute study of blooming dates by observing each individual blossom through all the stages of blooming on some twenty branches of two different varieties of cherry. Correlation coefficients between blooming date and weather elements like temperature, sunshine and precipitation are worked out. *Subject Headings: 1. Cherry blossom phenology 2. Fushiki, Japan.—G.T.*

10N-346

551.506.8:634.23(52)

Ichikawa, J. (*Central Met. Obs., Tokyo*), *Research on the flowering of cherry-blossom*. *Journal of Agricultural Meteorology*, Tokyo, 10(3/4):87-90, March 1955. 2 figs., 3 tables, 3 refs. In Japanese; English summary p. 90. **DWB**—Many papers have been published by investigators on the blooming of cherry blossoms in relation to meteorological factors. In connection with this problem the author measured the length of peduncle in the period between the breaking of a branch and the blooming date, and observed associated meteorological factors. The results are: (1) Two districts, Inogashira park (at Kichijoji) and Kojimachi (at the center of Tokyo city), have a significant difference in their mean blooming date. (2) The author states that the result of eye observation is comparatively reliable, in comparison with the measured date. (3) The most effective factor in the blooming date seems to be maximum temperature in that period. When the maximum temperature exceeds 7.05°C by 1°C, the length of peduncle increases 0.35 mm. *Subject Headings: 1. Cherry blossom forecasting 2. Phenological observations 3. Kichijoji, Japan 4. Tokyo, Japan.—Author's abstract.*

10N-347

551.586:551.506.8:634.23(52)

Japan. Meteorological Agency, *On the flowering of cherry-trees in 1957*. Its *Memoirs of Industrial Meteorology*, 22(1) 61-86, 1958. 4 figs., 3 tables, eq. In Japanese; English summary p. 66. **DLC**—We have investigated the growing conditions of buds from budding to flowering of cherry trees in Kanto district, and results obtained are as follows. 1) The observed weight, length and width of buds are shown in a table. 2) The first flowering date is shown. 3) It is considered that the delay of flowering is due to the low temperatures from mid Feb. to the end of March and the variations of pentad mean temperature (1956, 1957 and mean value) are shown. 4) The relation between the weight of buds and the flowering dates is expressed by an equation. 5) The difference in flowering dates in a small region (about 350 m²) is recognized. *Subject Headings: 1. Cherry blossom phenology 2. Plant bioclimatology 3. Kanto district, Japan.—Author's abstract.*

10N-348

551.506.8:551.586:58:634.23(52)

Japan. Meteorological Agency, *A phenological investigation of the flowering of cherry blossom (Prunus Yedoensis Matsum.) in 1958*. *Journal of Meteorological Research*, Tokyo, 11(5):401-407, May 1959. 2 figs., 2 tables. In Japanese. **DWB, DLC**—Buds were collected from 14 different sectors in the vicinity of Kanto region (including the city of Tokyo) during the period March 25-April 7. Phenological investigations included the measurement of weight (gr), length (mm), and width (mm) of 10 buds as a unit, in order to compare them with one another and with buds of the previous year, in search of variations and differences. The blossoming date in 1958 was comparatively earlier than that in 1957. *Subject Headings: 1. Phenological observations 2. Cherry blossom phenology 3. Kanto region, Japan.—K.C.*

10N-349

551.506.8:634.23(52)

Koyano, M., *Flowering dates of the cherry (P. yedoensis) in 1955*. *Japan. Central Meteorological Observatory, Tokyo, Memoirs of Industrial Meteorology*, 19(1):71-76, Dec. 1955. 3 figs.

tables. In Japanese; English summary p. 76. Also: Koyano, M. and Sakai, Y., **Flowering dates of the cherry (*P. yedoensis*) in 1956.** *Ibid.*, 20(2):67-74, Jan. 1957. 6 figs., 4 photos, 6 tables. In Japanese; English summary p. 74.—In the first paper the author investigated the growing conditions from budding to flowering of the cherry tree (*P. yedoensis*) in the Kanto district, and the results obtained are as follows: 1) Observed weight, length, width and inside status of flower buds are given. 2) The cherry trees in the central part of Tokyo flowered in the period March 23-27. These flowering dates are 4 or 5 days earlier than normal, perhaps owing to higher temperatures in the months from January to March, and the first dates of flowering are indicated. 3) The average of the first flowering dates for 1951-1955 is March 28. In the second paper, the results obtained are as follows: 1) Observed weight, length, width and inside status of flower buds are given. 2) The cherry trees in the central part of Tokyo flowered in the period March 27-31. These flowering dates are 3 or 4 days earlier than normal. But, these flowering periods from the first flowering to full flowering are 6 or 7 days longer than normal, perhaps owing to lower temperatures in the first decade of April. **Subject Headings:** 1. Cherry blossom forecasting 2. Cherry blossom phenology 3. Kanto District, Japan. **Authors' abstract.**

10N-350

551.506.8:634.23(52)

Kumano, Y., **On the forecast of the flowering and full-bloom dates of the cherry-tree (*P. yedoensis*) at Shimomoseki.** *Japan. Meteorological Agency, Tokyo, Memoirs of Industrial Meteorology*, 20(2):75-78, Jan. 1957. 2 tables. In Japanese; English summary p. 77-78.—1) Relationships between the dates of the first flowering and full bloom of cherry trees and the climatic elements of Jan., Feb. and March are shown. There is a high correlation between the soil temperature of March especially at 50 cm depth, and the dates of first flowering and full bloom of cherry trees. By use of the monthly mean of daily minimum screen temperatures and the monthly mean of soil temperatures at 50 cm depth for March, an equation is obtained for the purpose of forecasting. By use of the means of daily minimum (maximum) screen temperatures for the second and last decades of Feb. and for the first and second decades of March, equations are obtained for forecasting the first flowering date and the full bloom date of cherry trees. **Subject Headings:** 1. Cherry blossom forecasting 2. Cherry blossom phenology 3. Shimomoseki, Japan.—*From author's abstract.*

10N-351

551.524.32:581.1:634.23(52)

Misawa, Haruo, **On the average of air temperatures in spring at three representative valleys of Nagano Prefecture, Japan inferred from the observation of the flowering date of *Prunus subhirtella*.** *Journal of Agricultural Meteorology*, Tokyo, 9(3/4):136-138, Aug. 1954. 3 figs., table, 9 refs. In Japanese; English summary p. 138.—The writer wrote every primary school in Nagano Prefecture and Kitakoma County, Yamanashi Prefecture, adjacent to the north of the former, in the spring of 1938, to ask that the flowering date at each individual school be observed. The successful reports from as many as 1456 spots were all due to the observers' cordial cooperation. The observations show: 1) The flowering dates in the Kisogawa Valley were retarded in proportion to the height above sea level, i.e., the flowering date is the linear function of the altitude of the locality where the tree stands. 2) Data from the Tenryugawa Valley affirm the phenomenon though the dates are somewhat retarded considering the height at the left end of the flowering date curve. This is caused by the fact that the area is the place where the strong southerly wind blows through the year and where the Tenryugawa streams down and the valley stands very much higher than the bottom. Moreover, we can judge from the distance between two curves of 1936 and 1938 that the visit of spring in 1938 was approximately 6 days later than in 1936. 3) Contrary to the former two cases, the flowering date curve of the Chikumagawa Valley is quite curious. In winter, deep snow wraps up the lower course of the river, whereas the climate of the area south of the former is rather arid. Moreover, in the Ueda basin, lying in the leeward side of the winter winds, the seasonal winds are extremely weak and the air temperature is warmer. As for the former district, the thawing of the heavy snow is late, so that it remains chilly and retards the cherry blossoms. **Subject Headings:** 1. Spring temperatures 2. Cherry blossom phenology 3. Japan.—*From author's abstract.*

10N-352

551.506.8:634.23(52)

Okanoue, M., **On the cherry-blossom time in Tokyo district 1950.** *Japan. Central Meteorological Observatory, Tokyo, Memoirs of Industrial Meteorology*, 15(1):71-74, May 1951. 5 figs., tables. English summary p. 74. **DWB**—Cherry trees bloomed five days earlier than normally, perhaps owing to higher temperatures. **Subject Headings:** 1. Cherry blossom phenology 2. Tokyo, Japan.—*A.A.*

10N-353

551.586:634.23

Shinohara, H. (*Met. Station Ajiro, Japan*), **On the period, the temperature of which mostly influences the flowering date of the cherry.** *Journal of Agricultural Meteorology*, Tokyo, 7(1):19-20, Dec. 1951. 2 figs. In Japanese.—Comparison of temperature and blooming season reveals that

the most significant factor in determining the flowering of the cherry tree is the mean temperature of the 35-70-day period preceding it. *Subject Heading: 1. Cherry blossom phenology.—G.T.*

10N-354

551.506.8(519):634.23(52)

Shinohara, Hisao (*Utsunomiya Met. Station*), *On the temperature influencing the first flowering date of the cherry, in Korea.* *Journal of Agricultural Meteorology*, Tokyo, 8(12):23-24, March 1953. In Japanese; English summary p. 24. **DWB**—A study of the air temperature influencing the first flowering date of the flowering cherry in five localities in Korea. The dates are given for the following places: Pusan, Mokpo, Chonju, Wonsan, Songjin. *Subject Headings: 1. Cherry blossom phenology. 2. Korea.—I.L.D.*

10N-355

551.586:551.524.3:634.23

Smets, L. (*Inst. of Horticultural Plant Breeding, Wageningen, Netherlands*), *Some effects of temperature on the shoot growth of cherry seedlings.* *Euphytica*, Wageningen, 6(2):161-168, July 1957. photo, 4 tables, 8 refs. English and Dutch summaries p. 167. **DA, CU, PU**—In this phytotron of the Institute of Horticultural Plant Breeding, Wageningen, the effect was studied of different day and night temperatures on the shoot growth of first and second year cherry seedling (*Prunus avium* L.) grown under natural day length conditions. It was found that, after termination of growth, significant differences occurring simultaneously in shoot length and leaf number between the temperature treatments were mainly due to the effect of the day or night temperature on the duration of growth. In some cases these differences were also influenced by the effect of temperature on the rate of growth. Within the range of temperatures studied, no effect of the night temperature on the growth rate was observed. *Subject Headings: 1. Fruit culture 2. Cherry trees. 3. Temperature effects on cherry seedlings.—A.V.*

10N-356

551.506.8:634.23

Takasuna, M., *A phenological observation of the flowering and falling of cherry blossoms (Prunus yedoensis Matsum).* *Japan. Meteorological Agency, Tokyo, Memoirs of Industrial Meteorology*, 20(3):7-12, 1957. 6 figs., table. In Japanese; English summary p. 12. **DLC**—The author has studied the flowering and falling dates of a kind of flowering cherry (*Prunus yedoensis Matsum*) from a phenological point of view, for the period March-April 1956. The results are summarized as follows: (1) The date of opening of buds can be determined by measuring the water content of flowering buds. (2) Differences are found between the observed flowering dates calculated by the old and new methods, and there exists a certain relation between them, which proves the new method to be more useful. (3) It is important to know at what part of the branch the buds begin to open. Generally speaking, there is no regularity in the flowering order of buds along a branch except that at the extremity of a twig the bud always opens first. (4) The earlier the flower opens the longer it remains on the twig. (5) The flowering date of cherry trees is governed by the climatic environment closest to them. However, the influence is so limited, it does not control the full blooming date. Therefore, it may be concluded that the opening date of flowers is regarded as an indication of the microclimate of the locality, while the date of full bloom seems to be an indicator of the mesoclimate around the flowers. *Subject Headings: 1. Cherry blossom phenology 2. Cherry trees.—Author's abstract.*

10N-357

551.506.8:634.23(521.14):551.509.5

Umeda, S., *A phenological study of the cherry blossoms in Akita Prefecture.* *Journal of Meteorological Research*, Tokyo, 6(10/11):541-548, Dec. 1954. 5 figs., 2 tables, 15 refs. In Japanese; English summary p. 541. **DWB**. Also issued in: *Sendai, Japan. Central Meteorological Observatory Bulletin of the Meteorological Society for Research of Tohoku District*, 8(2):541-548, Jan. 1955. tables, 5 figs., 15 refs. In Japanese; English summary p. 541. **DWB**—The local flowering date of the cherry trees in Akita Prefecture was studied. The dates of the first flowering and blooming of various cherry species are given. The 5-day mean temperature before flowering for various localities in Akita is given. The relationship between the geographical distribution of the date of first flowering and full blooming and temperature distribution and the relationship between height above sea level and last day of continuous snow cover and date of first flowering by year are analyzed. *Subject Headings: 1. Cherry blossom phenology 2. Akita Prefecture, Japan.—I.L.D.*

10N-358

551.506.8:634.23(52)

Yamamoto, T., *On the relation between the meteorological elements and the flowering season of cherry trees.* *Japan. Meteorological Agency, Memoirs of Industrial Meteorology*, 21(2):131-136, 1958. 4 figs., 5 tables, 7 refs. In Japanese; English summary p. 136. **DWB**—In this paper, the author treats the flowering of cherry trees for 20 yrs at Aikawa. The main results are as follows: 1) The flowering date is closely related to the mean air temperature the preceding two weeks; 2) The flowering date has the highest correlation coefficient with the monthly minimum air temperature for

March; 3) Formulas for forecasting the flowering and full blooming dates are given:

$$Y = 37.69 - 3.66X_3 \text{ (full blooming date).}$$

The mean error with both these formulas is ± 2.4 days. *Subject Headings:* 1. Cherry blossom phenology 2. Aikawa, Japan.—*Author's abstract.*

Citrus Fruit

10N-359

551.586:551.506.8:634.3(663)

Cassin, J., *Influence du climat sur la floraison des citrus en Guinée*. [Influence of climate on the flowering of citrus in Guinea.] *Fruits*, Paris, 13(7):286-292, July/Aug. 1958. 2 graphs, 2 tables. DA—Study concerned with the influence of climate on the different vegetative phases of citrus in Guinea. Among the climatic data, one considers the pluviometric statements, the dates and volume of the last rain, the duration of the rainless period, the dates and volume of the first heavy rain, the mean temperatures and the mean minimum temperatures. Among the data relating to vegetation, one considers the dates of flowering and the dates of ripening. The author has examined both the dry cultivation and the irrigated cultivation. For the countries of Mediterranean type, the optimum climatic conditions seem to be two months' rest during a mild winter (mean temperature: 10°) with an active period having 22° as mean temperature. For the tropical countries, the optimum climatic conditions seem to be two months' rest, with a monthly rainfall less than 100-150 mm during this period (not necessarily rainfall reduced to nought, but perhaps 50-60 mm per month) and further when the fruits knit and swell, a monthly rainfall greater than 100-150 mm. *Subject Headings:* 1. Citrus orchards 2. Climatic effects on citrus orchards 3. Citrus fruit phenology 4. Guinea.—A.V.

10N-360

551.524.37:634.31(794)

Citrus fruit injury by freezing temperatures. *California Citrograph*, Los Angeles, 36(4):175-176, Feb. 1951. DA—Review of Freeze injury and subsequent seasonal changes in Valencia oranges and grapefruit by E. T. BARTHOLOMEW, W. B. SINCLAIR and R. P. HORSPOOL of the Calif. Citrus Experiment Station at Riverside, Calif., issued as *Bulletin* No. 719 of the University of Calif. College of Agriculture. Studies were made of effects of freezing on Valencia oranges. Badly frozen and slightly frozen fruit was tested. Young or immature fruit recovers more completely than mature fruit. Favorable weather following frost aids recovery. *Subject Headings:* 1. Frost damage to citrus orchards 2. Oranges 3. Southern California.—M.R.

10N-361

551.509.612:551.524.37:621.647.2

Dean, Rollo H. (*Meteorologist*), *Effectiveness of water sprinklers when used for protection against freeze damage*. *Federal-State Warning Service, Lakeland, Fla., Weather Forecasting Mimeo* 59-8, April 21, 1959. 3 p. DWB—A report describing the effectiveness of a water sprinkler system, installed during the summer of 1958, on five acres of the West Volusia Nurseries, De Land, Florida, to protect small citrus trees from freeze damage during the winter. The paper gives the details of the sprinkler system apparatus and also of the instruments used to check the effectiveness of the method. The experiment was conducted on four nights, Jan. 10-12 and Jan. 16-19, during the 1958 season. The data thus obtained, showing the lowest air temperature recorded inside and outside the protected area, the departure inside from the outside check station, the duration in hours and tenths of hours at temperatures of 32°F and lower, are tabulated. It is concluded that the sprinkler method is an efficient and practicable method of protecting a citrus nursery from freeze damage during most freezes experienced in Florida. Other specific conclusions are also given. *Subject Headings:* 1. Freezing damage prevention 2. Water sprinklers 3. Citrus orchards 4. De Land, Fla.—I.S.

10N-362

551.509.61:551.311.3:634.3 551.509.612:551.524.37:634.3

Dean, Rollo H. (*Meteorologist*), *Practicability of enclosing soil banks with asphalt roofing paper for protection of small citrus trees against soil erosion and freeze damage*. *Federal-State Warning Service, Lakeland, Fla., Weather Forecasting Mimeo* 59-9, April 22, 1959. 3 p. 2 tables. DWB—This paper reports the successful efforts of two citrus growers in the De Land area, H. A. DOOLEY and P. V. PROCTOR, to enclose soil banks on young citrus trees with asphalt impregnated felt, commonly known as roofing paper, for protection against soil erosion and freeze damage. The experiment succeeded in its two objectives, namely: 1) to prevent erosion of the soil banks by high winds and heavy rain, and 2) to protect a greater portion of the tree trunks from freeze damage. The paper gives details of the experiment and lists conclusions and recommendations. The temperature of the air 12 in. above the ground midway between the two types of soil banks; the temperature of the soil at the tree trunk in both types of banks at depths of 2 in. and 6 in.; and the departure of soil temperatures from the air temperature are tabulated. *Subject Headings:* 1. Freezing damage prevention 2. Soil erosion prevention 3. Citrus orchards 4. De Land, Fla.—I.S.

10N-363

551.509.612:634.3

Gustafson, C. D., **Frost protection for young trees.** *California Citrograph*, 37(4):135, Feb. 1952. fig. **DA**—Of many types of devices used for protecting young trees or plants from frost, one of the most effective is that of "umbrellas" or coverings to reduce outgoing radiation on still nights. The fact that natural covering provided by outer leaves of plants, has left undamaged the buds or flowers within the foliage at times when outer flowers were frosted; and artificial covers where avocaddo trees, for example, survived 26°F temperatures twice in 4 yrs are cited. *Subject Headings: 1. Frost protection of orchards 2. Citrus orchards.—M.R.*

10N-364

551.524.37:632.111.5:634.3

Tumanov, I. I., **Novye sposoby zashchity nasazhdenii limona ot vmerzaniia.** [New methods of protecting lemon trees against frost.] *Priroda*, Moscow, No. 6:91-95, June 1953. 4 figs. **DLC**—Momentary frosts (5-9°C below 0°) occur sometimes even in western Georgia (Caucasus), the only region in the U.S.S.R. where lemon trees are cultivated on a large scale. They can not only damage the crop but sometimes destroy the trees. On a level with the development of frost resisting properties of the lemon tree which is achieved by complex physiological and chemical processes, growers have to resort to other means, such as covering the young plants with gauze or heating or smoke screening the plantations. In this paper are presented the results obtained by a joint expedition of 4 Institutes of the Academy of Sciences and one Institute of the Ministry of Agriculture which studied in the winter of 1952 measures of combatting frost damage in the Sukhum region. Besides evaluating the usefulness of heating orchards with different kinds of flameless fuel, the expedition tested a new method of distributing them in the area. Methods of smoke screening to lessen the radiational cooling by burning red phosphorus were also investigated. It was shown that a smoke screen, covering a large area, decreases the emission of heat from the surface of the plants and the soil and thus reduces their cooling. *Subject Headings: 1. Frost protection of orchards 2. Citrus orchards 3. Georgian S.S.R.—A.M.P.*

10N-365

551.509.612:551.556.2:634.3

Uehara, Masaki and Isozaki, Yoshimasa (*Kagawa Agri. College*), **Micrometeorological observation on the protection against the cold for the Satsuma orange (*Citrus Unshiu* MARC) trees.** Pt. 1. *Kagawa, Japan. Agricultural College, Technical Bulletin*, 4(1):56-60, July 1952. 5 figs. English summary p. 60. **DWB**—A spiral windbreak 2 m high was built on a slope from the N to the SW side of a Satsuma orange tree 1.7 m high. The horizontal and vertical distribution of minimum temperature and evaporation on front and rear side were measured in the winter of 1951 and the results shown in figures and discussed. Wind conditions are also included in analysis. *Subject Headings: 1. Frost protection 2. Windbreaks 3. Citrus orchards 4. Orchard microclimatology 5. Kagawa Agricultural College, Japan.—M.R.*

Lychees (Litchis)

10N-366

551.586:634.75

Bartlett, G. S. (*Office of Climatology, U. S. W. B., Wash., D. C.*), **Lychee: The strawberry tree.** *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, Wash., D. C., 43(52):7-8, Dec. 24, 1956. table, 10 refs. **DWB, DLC, DA**—This subtropical fruit, originally from southern China, was introduced into Florida in the early 1880's. High and low humidity are needed for its culture and ripening respectively. Air layering is used for its propagation in Florida. A chart shows the average temperature, precipitation and relative humidity at 7 selected stations. *Subject Headings: 1. Lychee trees 2. Temperature data 3. Florida.—N.N.*

10N-367

551.506.3:551.524(774) 551.584.4:634.3

Norman, Oscar N., **Notes on critical temperatures lychees and citrus.** *Federal-State Warning Service, Lakeland, Fla., Weather Forecasting Mimeo* 59-7, April 20, 1959. 3 p. almost entirely tables. **DWB**—Data consisting of temperature recordings during 1958-59 season from 30 stations at DeSoto City are tabulated. Pertinent notes as to condition of trees, made at intervals when readings were collected, are also inserted. Of the stations reporting, only one (3529-B) is located in a lychee grove; others are surrounded by citrus trees. *Subject Headings: 1. Citrus orchards 2. Lychee trees 3. Temperature data 4. De Soto City, Fla.—I.S.*

Mulberries

10N-368

551.509.612:634.3

Kumagaya, Japan. Weather Station, **Experiments of the protection of mulberry farms against frost by heavy oil burning.** *Japan. Meteorological Agency, Tokyo, Memoirs of Industrial Meteorology*, 20(1):9-17, Oct. 1956. 7 figs., 2 tables. In Japanese; English summary p. 17. **DLC**—Fo

the experiments, one standard area without fire points and three areas heated by fire points of burned heavy oil were settled, and the vertical and horizontal distributions of air temperature were measured. The difference in the heating effect, due to the size of burning vessels and to the number of fire points per unit area, was investigated. The results are summarized as follows: 1) The thermal effect by heating at about 1 m height is influenced by the vertical gradient of air temperature. 2) The warmed area is sensitive to winds and is transferred leeward. 3) The rise of the air temperature at the center of the warmed area is about 1.5°C in the two cases of 60 small vessels and 32 big vessels respectively, while in the case of 32 small vessels it is 0.7°C. *Subject Headings: 1. Frost protection of orchards 2. Smudging of orchards 3. Mulberry trees.—Author's abstract.*

10N-369

551.509.612:634.38

Sato, T.; Imuta, S. and Sato, T., *Experiments of the protection of mulberry farms against frost.* Japan. Meteorological Agency, Tokyo, *Memoirs of Industrial Meteorology*, 20(1):19-22, Oct. 1956. 2 figs., 4 tables. In Japanese; English summary p. 22. **DLC**—In order to protect mulberry trees against frost damage, the air of an experimental field was heated by burning heavy oil and chaff, and the horizontal and vertical distributions of air temperature were investigated. The experiments were carried out at Mie in Oita Prefecture on April 20-21, 1955. As a result of these experiments, we found a good and uniform distribution of temperature rise of 1.0°C (max. 2.3°C) on an average at 1.5 m height above the ground in the central part of the observation area. The vertical distribution of air temperature shows that the temperature is higher at 1.5 m than at the 0.2 m height. From the results, we shall be able to protect mulberry trees against frost damage. *Subject Headings: 1. Frost protection of orchards 2. Orchard heating 3. Mulberry trees 4. Oita Prefecture, Japan.—Authors' abstract.*

10N-370

551.509.612:634.38

Taguchi, R. and Okumura, H. (*Shinshu Univ.*), *On the influence of the removal of small shoots upon the vertical distribution of air temperature among the trees (Studies on the microclimate in the mulberry field, Pt. 2).* *Journal of Agricultural Meteorology*, Tokyo, 10(1/2):27-29, Dec. 1954. 2 figs., 5 refs. In Japanese; English summary p. 29. **DWB**—In growing the mulberry tree, several small shoots are usually cut off in summer from each stock near the ground from which many shoots are regenerated every year. In the present experiment, the vertical distribution and its diurnal changes of air temperature were comparatively investigated in the two mulberry fields, the one being the field of the untrimmed control trees and the other being the field of the trees from which the small shoots had been removed. On the soil surface and also on the point a little above the soil surface, the mean and maximum temperatures in the daytime and the temperature difference between the maximum and the minimum were found to be far higher in the field of the trees from which small shoots had been removed than in the control one. These results were due to the fact that the solar radiation could not reach the soil surface in the case of the control field, while it could reach it in the case of the tested field. *Subject Headings: 1. Orchard microclimatology 2. Mulberry trees.—Authors' abstract.*

10N-371

551.506.8(52)

Yoshino, Masatoshi (*Tokyo Education Univ.*) and Fusuki, K. (*Risshō Univ.*), *A phenological study of the kaiyō (leaf development) of the mulberry plant.* *Journal of Agricultural Meteorology*, Tokyo, 12(2):48-52, Oct. 1956. 2 figs., table, 12 refs., 11 eqs. In Japanese; English summary p. 52. **DWB**—The first kaiyō (leaf development) date, together with the number of subsequent kaiyō dates, is an important index from the viewpoint of phenological and sericultural problems. Following is the summary of this paper; The first kaiyō date of the mulberry leaves (*Morus argutidens* Koidz and *Morus alba* L. var.) depends clearly on the March mean monthly air temperature. This relationship was confirmed both by data for many yrs at one point and by data for 1955 at about ten points. It seems that the effect of the March mean monthly air temperature upon leaf development was greater at a cold point where the first kaiyō date was late. Comparing the data observed at about ten points, it can be said that, in the last ten days of April and the first ten days of May, the earlier the first kaiyō date came, the lower was the rate of the leaf development. But, regarding every single point, it was lower in the last ten days than in the first ten days. Experimental formulas were obtained for these relationships in the periods mentioned above. *Subject Headings: 1. Phenological observations 2. Mulberry trees 3. Japan.—Authors' abstract.*

Peaches

10N-372

551.586:634.25:581.5

Blommaert, K. L. J., *Winter temperature in relation to dormancy and the auxin and growth inhibitor content of peach buds.* *South African Journal of Agricultural Science*, Pretoria, 2(4):507-514, Dec. 1959. 2 figs., 7 refs. English and French summaries. **DLC**—Analyses of the auxin and

inhibitor content of peach bud extracts derived from trees differentially subjected to relatively cold and warm dormant periods were compared. As dormancy was broken, the inhibitor content dropped more rapidly in the former than in the latter case. This finding partly confirms an hypothesis previously formulated by the writer suggesting that adequate cold stimulates inactivation of the inhibitor. On the other hand, delayed inactivation of the inhibitor during a relatively warm dormant period may disturb the auxin/inhibitor balance thus giving rise to prolonged rest or delayed foliation in spring. *Subject Headings:* 1. Peach ecology 2. Low temperature effects on peach buds.—*Author's abstract.*

10N-373

551.524.37:634.25

Carter, Horace S. (*State Climatologist, U. S. W. B., Athens, Ga.*), **Weather and peaches in Georgia.** *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 44(4):7-8, January 28, 1957. 3 tables. **DWB, DLC, DA**—Weather is important for the success or failure of the peach industry. In the past 10 yrs several Georgia locations have computed the accumulated chilling hours through Feb. 15. The hazards of freeze damage can be lessened by considering the problem of air drainage when the selection of an orchard site is to be made. *Subject Headings:* 1. Frost hazard 2. Peach orchards 3. Air drainage 4. Georgia.—*N.N.*

10N-374

551.524.371:632.111.5:634.25

Crawford, Todd V. and Brooks, F. A. (*both, Univ. of Calif., Davis*), **Frost protection in peaches. New model under-tree wind machine tested with and without burners in orchard near Wheatland during winter of 1958-59.** *California Agriculture*, Berkeley, 13(8):3-6, August 1959. 3 photos, 6 graphs, table.—To investigate whether a near-the-ground wind machine under the tree canopy might be directly effective in preventing air stratification leading to frost damage in the lower parts of the trees, tests were made during the winter 1958-59. Instrumentation included thermocouples, anemometers, wind direction indicators, soil temperature recorders, soil heat flow plates, radiation measuring instruments, glass bulb thermometers and a complete University microstation for a continuing record. The temperature responses obtained on the mornings of March 20 and 25, 1959 at the 6' and 15' levels are indicated in graphs. Curves are also presented of vertical temperature profile changes due to the wind machine and wind machine-burner. The latter combination gives more protection close in but does not seem to have a significant effect on the areas of one to two degree temperature rise at 6' and 15'. On March 20, the wind machine gave 1°F gain at 6' height over 2.7 acres and 2°F over 0.6 acre, whereas the wind machine+burner gave 1°F gain at 6' over 2.2 acres. On March 25 the wind machine gave 1°F gain at 6' over 3.8 acres and 2°F over 1.1 acres, whereas the wind machine+burner gave 1°F over 4.2 acres, 2°F over 1.1 acres and 3°F over 0.2 acre. For the latter date the numbers are also known for 15': 1°F over 6.1 acres and 2°F over 1.6 acres for the wind machine and 1°F over 2.9 acres for the wind machine+burner. *Subject Headings:* 1. Frost protection of orchards 2. Wind machines 3. Peach orchards 4. Wheatland, Calif.—*A.V.*

10N-375

551.524:664.8

Culpepper, C. W.; Haller, M. H.; Demaree, K. D. and Koch, E. J., **Effect of picking maturity and ripening temperature on the quality of canned and frozen eastern-grown peaches.** *U. S. Dept. of Agriculture, Technical Bulletin*, No. 1114, April 1955. 31 p. 13 figs., 10 tables, 14 refs. **DWB**—Halehaven and Elberta peaches at 95°, 85°, 75° and 65° for 2-4 days were compared with each other and with tree-ripened fruit as to rate of ripening, color, flavor, texture, and general acceptability for freezing or canning with or without previous cold storage. Scores indicated that cold storage for 2 weeks does not adversely affect quality of peaches if ripening occurs afterwards. Longer storage or storage of ripened fruit does deteriorate quality. Rate of ripening is equally fast at 65°, 75° and 85° but slower at 95°, and at 65° there was less decay than at higher temperatures. *Subject Headings:* 1. Temperature effects on maturing peaches 2. Fruit storage 3. Fruit ripening.—*M.R.*

10N-376

551.510.41:546.264:634.25

Iizuka, I. (*Ehime Univ., Faculty of Education*), **On carbon dioxide in the peach orchard.** *Journal of Agricultural Meteorology*, Tokyo, 11(3):84-86, Dec. 1955. 4 figs., 5 refs. In Japanese; English summary p. 86. **DWB**—Carbon dioxide concentration in the peach orchard was microclimatically measured. A Haldane gas analyzer was used. This gas concentration was lower in the daytime than in the nighttime and it increased rapidly after sunset. It is probable that this phenomenon was caused by more vigorous carbon assimilation than respiration in the daytime and by the fact that at night the former ceased and only the latter was carried out, and that more of this gas was released from the soil in the nighttime than in the daytime. Since it scarcely blew at night, the atmosphere where leaves were thicker and nearer to the ground surface contained more of this gas than in other parts in the orchard. In the early morning, the gas began to decrease gradually from the part of the tree where the sun fell. This phenomenon extended towards shady part of the tree as the sun rose higher. A constant tendency was recognized during daytime when wind blew.

Subject Headings: 1. Carbon dioxide in peach orchards 2. Diurnal carbon dioxide variations in Peach orchards.—*Author's abstract.*

10N-377 551.586:634.25(757)
*Kronberg, Nathan; Hagler, T. B.; Purvis, John C. et al., **Climate and peach production in South Carolina.** *South Carolina. Agricultural Experiment Station, Climatic Series*, No. 4, Oct. 1959. p. 8 figs., tables, 15 refs. (*Agronomy & Soils Research Series*, No. 18.) DWB (M(055) S726cL)
Peach raising succeeds best in a region where weather conditions are not extreme. A study conducted at 28 South Carolina weather stations evaluates the effects of the hazards of winter cold, hail, frost, wind storms, and excessive low temperatures on the crops. It indicates that in order to raise good peaches, the chilling hours of the particular area must be studied because some varieties thrive best at temperatures of 45°F while others endure temperatures below this level. **Subject Headings:** 1. Climatic effects on peach trees 2. Peach climates. I. Collings, Gilbeart H.—N.N.

10N-378 551.524.37
Peterson, P. D. (Stauffer Chemical Co.), **Frost hazard and cover crops.** *American Fruit Grower*, Willoughby, Ohio, 78(3):11,55,63, March 1958. DWB—A peach grower's experience is described which appears to prove that frost damage is less severe over hard bare ground than over ground covered with crops or freshly stirred. **Subject Headings:** 1. Frost hazard 2. Peach growing.—G.T.

10N-379 551.586:551.524.36:634.25
Purvis, J. C. (U. S. W. B., Columbia, S. C.), **Weather and peaches in South Carolina.** U. S. Weather Bureau, *Weekly Weather and Crop Bulletin*, 46(2):6-8, Jan. 12, 1959. 5 figs., 2 tables, 3 refs. LC—Extreme cold temperatures are a requirement for the proper performance of peaches during the following spring season. This paper discusses the chilling hrs (the air temperature below 45° during one hr) that are suitable in raising the various kinds of peaches. Several charts showing the Oct.-Feb. 1949-58 chilling hours in South Carolina are given. It is noted that during the period about 70% of the seasons had 1360 or more chilling hrs. **Subject Headings:** 1. Peach climates in South Carolina.—N.N.

10N-380 551.586:634.25
Takaya, S., **On the relation between climate and the June dropping of peach fruits.** *Journal of Meteorological Research*, Tokyo, 11(5):369-372, May 1959. fig., 3 tables, 5 refs. In Japanese; English summary p. 369. DWB, DLC—From the viewpoint of providing agricultural meteorological information for cultivators, it is desirable that weather conditions in growing stages of crops be studied. This is being done for rice, plant, barley and wheat, and should be done also for horticultural crops. In fruit production, most fruit trees suffer from dropping of fruit, the so called "June dropping." For peach production in Okayama Prefecture, the dropping of fruit in the "stoning stage" is an especially important problem. Accordingly the author has attempted to study the relation between climatic conditions during that period and peach dropping. As for the climatic conditions which may cause the peach dropping, it is generally said that the dropping in the stoning stage is caused by the deficit of sunshine or by heavy rainfall. But, according to the author's study of the yrs of severe dropping like 1937 and 1953, severe dropping is caused by the combination of a sunshine deficit and heavy rainfall. Limiting values of these weather conditions are generally such that sunshine duration is 10 hrs or less and precipitation is 130~140 mm or more in the most important 5-day period in the stoning stage. In addition to such conditions, the dropping becomes greater by a decrease in orchard moisture for some time previous to the stoning stage. Finally, the author thinks the dropping of peaches is caused by great variations in climatic conditions and soil moisture. It is likely that the dropping of peaches can be prevented by the irrigation of peach orchards in cases of dry, late spring and early summer, or by the drainage of orchards in the event of heavy rain in early "Bai-u" season. **Subject Headings:** 1. Peach climates 2. Okayama Prefecture, Japan.—*Author's summary.*

Pears

10N-381 551.509.62:634.13
Fukushima, Japan. Meteorological Observatory, **On the effect of the blazing fire in the protection of pear orchards against frost.** *Journal of Meteorological Research*, Tokyo, 6(10/11):567, Dec. 1954. In Japanese; English summary p. 567. DWB. Also in: *Sendai, Japan. Central Meteorological Observatory, Bulletin of the Meteorological Society for Research of Tohoku District*, (2):567, Jan. 1955. In Japanese; English summary p. 567.—In this paper the author reexamined the direct heating method. The results of the experiment were as follows: 1) The increase of air temperature in orchards, as a whole, was found to be about 2°C by making 16 wood fires per 1 tan (Japanese square measure, corresponding to 0.245 acre), and moreover the thermometer installed

at the center of 4 fires showed a rise of 0.7°C or more on account of direct radiation from the fire. If we set twice the number of fires, the temperature might rise to about 3°C . 2) It is effective to suspend a porous cover, such as a straw mat or blind, from the trellis above the fire to help the horizontal diffusion of heat and to protect the flowers from overheating by the flame. *Subject Headings: 1. Frost protection of pear orchards 2. Orchard heating.—Author's abstract.*

10N-382

551.524.37:634.1

Ozawa, Y. and Honda, Isao (both, *Nat. Inst. of Agric. Sci.*), **Some experiments on the frost damage of pears (*pyrus serotina*)**. *Journal of Agricultural Meteorology*, Tokyo, 11(1):35-36, July 1955. fig., table. In Japanese; English summary p. 36. **DWB**—*Pyrus serotina* (Chojuro) planted in pots were treated with several kinds of low temperature in the cool rooms. Observing the air temperature and the plant temperature during treatments and surveying the injury of ovary after treating, we found the following facts: 1) In the stage before and after blooming, the cold resistance of the ovary becomes weak in the order of bud, blooming and after-blooming. 2) When the ovary temperature of -1.5°C continues for 1.5 hrs, the ovary dies. 3) The critical ovary temperature of frost damage appears between -1.5°C and -1.0°C , provided the duration of low temperature is more than 30-60 min. 4) In the natural state, the ovary temperature is commonly lower than the surrounding air temperature at night. But the above relationship is inverse in our experiments. This fact will suggest experiments to determine the critical temperature of the freezing of plants, since the experimental results in the cool room don't necessarily represent those under natural conditions. *Subject Heading: 1. Frost damage to pears.—Authors' abstract.*

10N-383

631.95:634.13:551.5

Thibault, B., **Choix des variétés de poiriers en fonction des conditions de milieu**. [Choice of pear tree varieties according to the conditions of the milieu.] *France. Ministère de l'Agriculture. Bulletin Technique d'Information des Ingénieurs des Services Agricoles*, No. 135:633-637, Nov.-Dec. 1958. 13 refs. **DA, DLC**—Study of the influence of the natural milieu on the choice of pear tree varieties. The author examines the influence of soil through studying successively the influence of its physical nature, its fertility, its depth and its reserves of water. Among the climatic factors he considers the influence of temperature, precipitation, wind and luminosity. Concerning the relation between climate and vegetation, he studies the parasitical attacks and more particularly cryptogamic diseases. *Subject Headings: 1. Pear tree ecology 2. Soil influences on pear tree 3. Climatic effects on pear trees 4. Pear trees.—A.V.*

Plums

10N-384

551.586:551.524.36:634.22:632.111.

†Murawski, Heinz, **Beiträge zur Züchtungsforschung an Pflaumen**. [Contributions to plum cultivation research.] *Der Züchter*, Berlin, 29(1):21-36, 1959. 26 figs., 7 tables, 31 refs. **DA**—Morphological and pomological investigations on *Prunus cerasifera* are described. Systematic work makes it possible to increase frost resistance. Phenological observations in Germany between 1944 and 1955 are presented and a comparison is made with phenological observations on *Prunus cerasifera* in Turkey. Frost resistance of plants (1954-1956) and the effect of climatic conditions on frost resistance are treated in some detail. *Subject Headings: 1. Plum phenology 2. Plum cultivation 3. Frost resistance of plums 4. Climatic effects on frost resistance.—A.V.*

PEANUTS

10N-385

551.521.16:551.524:634.5

Algèbre, G., **Contribution à l'étude du photopériodisme de l'arachide en relation avec la température**. [Contribution to the study of photoperiodism of peanuts in connection with temperature.] *L'Agronomie Tropicale*, Nogent-sur-Marne, 12(4):494-507, July/Aug. 1958. 12 figs. **DLC**—Peanuts were grown in the Paris area, some with normal day duration, the others with a shortened duration of 9 hrs. Each one of these lots was also submitted to three different thermal treatments: optimum glass house temperature during 24 hrs; same temperature during the night only; open air temperature during 24 hrs. Under optimum thermal conditions, shortening the day to 9 hrs has considerable bearing on flowering (50% reduction). When the optimum thermal factor operates during the night only, the flowering rate is practically equal for the normal day treatment and the shortened day treatment. Under insufficient thermal conditions, shortening the day increases the flowering rate more than three times. It must be stated that the slight nocturnal temperature rise due to technical defects in the obscuration cages, adds perhaps to the influence of day shortening. Comparison between the flowering shows that: 1) For lots with normal photoperiods, the results of the optimum thermal treatment during 24 hrs and of the same treatment during the night are practically identical, but there is a considerable effect on the lot submitted to night cooling. 2) For

is with shortened photoperiods, the best conditions are those of the treatment insuring a rise in night temperature. *Subject Headings:* 1. Photoperiodism of peanuts 2. Temperature effects on peanuts 3. Daylight duration 4. Peanuts 5. France.—A.V.

10N-386

551.506.8:551.586:634.58

Bolhuis, G. G., *Observations of the flowering and fructification of the groundnut, arachis hypogaea*, [Pt. 1.] *Netherlands Journal of Agricultural Science*, Wageningen, 6(1):18-23, Feb. 1958. 4 figs., table, 6 refs. Pt. 3, *Ibid.*, 7(1):51-54, Feb. 1959. 4 figs., 3 refs. DA—Plants of the Schwarz variety were grown at Buitenzorg (Java) in pots with sterilized soil and in the open air to determine whether these plants would show any differences in behavior in regard to flowering and fruit setting. It was found that the flowering cycle of the plants was little affected by variations in climatic conditions and by differences in growing space. The last factor, however, did have some effect on the incidence of fruiting. *Subject Headings:* 1. Peanut culture 2. Climatic effects on peanuts.—A.V.

10N-387

551.586:634.58

*Fortanier, E. J. (*Lab. for Tropical agric. plants, Agric. Univ., Wageningen, Netherlands*), *De invloed van de bloei bij Arachis Hypogaea L.* [Control of flowering in *Arachis Hypogaea L.*] Wageningen. Landbouwhoogeschool, Mededelingen, 57(2), 1957. 116 p. 21 figs., 41 tables, 9 photos, 161 refs. Each chapter summarized. English summary p. 111.—The effect of light (intensity, duration and spectral composition), temperature (varying day and night temperature) and water (varying humidities of the soil and the air) on flowering of the peanut (*Arachis hypogaea L.*) was investigated. Because growth and fruit formation are also influenced by these factors, the relation between growth, flowering and fruiting was the problem investigated. Drought suppressed flowering; no antagonism was found between growth and flowering. Removal of pegs and fruits promoted flowering which is suppressed by developing fruit. The initiation of flowers is independent of photoperiodism and of thermoperiodicity and cannot be regulated. The formation of leaves and inflorescences are almost inseparable. The opening of flower buds and the total number of flowers formed are highly dependent on external conditions. Hence flower bud initiation is less sensitive to external conditions than the actual flowering. The experiments gave a better insight into the physiology of flowering, which can be regulated now, more or less, at will. In abundant or poor flowering can be obtained; the opening of flowers can be delayed, prevented or continued indefinitely; in this way almost any number of opened flowers can be at one's disposal at any time of the year or the day. *Subject Headings:* 1. Peanut culture 2. Climatic effects on peanuts.—Author's abstract.

10N-388

551.586:551.577:634.58

Fourrier, P. and Prevot, P., *Influence sur l'arachide de la pluviosité, de la fumure minérale et du trempage des graines.* [Effect on peanuts of rainfall, mineral fertilizers and soaking of seeds.] *Oléagineux*, Paris, 13(11):805-809, Nov. 1958. 3 figs., 5 tables, 2 refs. DLC—A 4×2×2 factorial experiment has been performed at Louga, Senegal, a region with low rainfall. Treatments were as follows: A₀: natural rainfall (407 mm); A₁: rainfall stopped from the 35th to the 60th day after sowing (242 mm); A₂: rainfall from 60th to the 85th day (312 mm); A₃: rainfall from the 85th to the 10th day (340 mm); NP fertilizer or nil; seed soaking with CaCl₂ or nil. Only rainfall interruption at the flowering time (A₁) had a pronounced depressive effect on growth and flowering. For A₀, NP highly increased growth and flowering; the NP effect was lowered by rainfall interruption, although growth was as good with NP and rainfall interruption as without NP and no rainfall interruption. Yields were significantly depressed by A₁ and A₂ treatments, but the NP fertilizing could raise the yields to the level of the A₀ without NP. Drought reduced considerably the NP effect; CaCl₂ soaking had in general a depressive effect, although it was positive (not significant) for the A₂ treatment. It may be concluded that drought has a strong depressive effect on growth, flowering and yield, but that NP fertilizing can compensate for this depressive effect. *Subject Headings:* 1. Peanuts 2. Climatic effects on peanuts 3. Fertilizer effects on peanuts.—A.V.

10N-389

551.586:551.579.5:634.58

Ibyina, A. I., *Etude des périodes de haute sensibilité de l'arachide aux différences de l'humidité du sol.* [Study of periods of the peanut's high sensitivity to differences in soil moisture.] *Oléagineux, Pastenii*, Moscow, 5(3):253-258, 1958.—Study of the periods of the peanut's sensitivity to differences in soil moisture especially during the period during which flowers are setting. Author examines successively the influence of soil moisture on the duration (in number of days) of the development stages of the peanut, on the alterations of certain anatomical characters of the leaves, on the changes in number of stomates of the cuticle. The requirements of the peanut in regard to moisture vary in the course of growth and development of the plant: they are the least important during the period

between germination and setting of the flower's organs. Soil moisture is used most profitably for the yield at the time when flowers are setting and blossoming. *Subject Headings: 1. Peanut culture 2. Soil moisture effects on peanuts.—A.V.*

10N-390

551.524.37:634.1

Long, A. R. (*Meteorologist in charge, Weather Bureau Office, Montgomery, Ala.*), *Weather and the peanut crop*. U. S. Weather Bureau, *Weekly Weather and Crop Bulletin*, 43(18):6-8, Nov. 26, 1959, figs., 3 tables. **DWB, DLC, DA**—Nothing can be done to prevent damage to the peanut crop from late cold snaps. The results of experiments by the Alabama Polytechnic Institute showed that peanut seed curing is best if exposure to adverse weather is at a minimum. *Subject Headings: 1. Frost damage to peanuts 2. Peanut crop.—N.N.*

10N-391

551.586:551.584:634.58(67)

Niclaes, J. and Demol, J., *La floraison de l'arachide dans les conditions climatiques de Bambesa*. [The blossoming of the peanut in the climatic conditions of Bambesa.] *Belgium. Direction Générale de l'Agriculture, Bulletin Agricole du Congo Belge*, 44(6):1501-1512, Dec. 1958. 3 figs., 6 tables. **DLC**—In the climatic conditions of Bambesa, for an early variety of the peanut of the erect type: 1) Flowering starts in a very regular manner about 25 days after the sowing. 2) Blossoming comprises 4 stages: a) starting of the flowering until its maximum (9 days); b) regression of the number of flowers per plant up to the blossoming stage (5 days); c) blossoming stage (12 days); d) fall of florescence (from the 49th day after sowing). 3) Below 31°C, a global increase of blossoming is dictated by a rise in temperature during the period covering the ten days preceding and the twenty days following flowering. 4) A complete stop in illumination for one day causes, with a delay of three days, an arrest of blossoming. 5) Abundant blossoming of the peanut appears only three days after a day presenting a temperature of a least 28°C and a minimum sunshine duration of 4 hrs. Points 4 and 5 seem to point out the existence of photoperiodism and thermoperiodism as factors determining the blossoming of the peanut. *Subject Headings: 1. Peanuts 2. Climatic effects on peanuts 3. Bambesa, Belgian Congo.—A.V.*

10N-392

551.586:551.579:634.5

Ochs, R. and Wormer, Th. M., *Influence de l'alimentation en eau sur la croissance de l'arachide*. [Influence of water feeding on the growth of peanuts.] *Oléagineux*, Paris, 14(5):281-291, Mar. 1959. 7 figs., 15 tables, 5 refs.—Investigation of the behavior of peanuts with regard to soil moisture. Description and results of experiments made in culture tanks, concerning respectively the various stages: germination-flowering, flowering-ripening, and ripening alone. Drought reduces the number of leaves and enlarges the number of leaves per length unit of stalk; it does not cause untimely leaf fall within the intensity limits imposed by the driest treatment. During the period of active growth, i.e. approximately between the 30th and 60th day after sowing, growth in length is very sensitive to drought. This sensitivity diminishes afterwards and becomes negligible about the 75th day after sowing. Soil which is not kept in immediate proximity of the field capacity ($pF=2.2$) does not insure the plant a maximum production of dry matter. The period of great activity, from flowering to the 50th day, is very sensitive to drought; the period of slight activity is on the contrary much less sensitive. Drought reduces greatly the number of flowers formed on the whole, principally through its indirect action on the length of stalks and also, but to a lesser degree through its direct action on the growth of flower buds and on the mean number of flowers on a stalk. *Subject Headings: 1. Peanut culture 2. Soil moisture requirements of peanuts.—A.V.*

RICE

10N-393

551.524:581.14:633.1

Abe, Izo (*Tohoku National Agric. Experiment Station*), *Studies on the years of past cool weather from characteristics of air temperature in rice plants (Analysis of cool weather in the Tohoku District Pt. 1)*. *Journal of Agricultural Meteorology*, Tokyo, 13(1):37-40, July 1957. 2 figs., 4 tables, 6 refs. In Japanese; English summary p. 40. **DWB**—The writer conducted research on the relation between the yield of rice plants and air temperature in Tohoku District. The results are as follows: 1) In Tohoku District, the correlation of monthly mean temperature in June with that in July and Aug. was higher than the correlation with other months, the highest one being between June and July. These were recognized as regional differences. 2) The characteristics of air temperature in the period of rice culture, 1890-1956, are divided into classes, and years of cold damage are pointed out. 3) Owing to development of culture techniques and improvement of variety, however, recently seems possible to prevent the injury of delayed cold damage such as occurred in the past. *Subject Headings: 1. Temperature effects on plant growth 2. Rice culture 3. Temperature correlation 4. Tohoku District, Japan.—Author's abstract.*

10N-394

551.586:633.18:633.3

Abe, Izo (*Aomori Agric. Exper. Sta.*), *Agro-climatic studies on the difference of the climate each year. Pt. 1, Studies on the relationship between the summer season at Morioka and growth of rice-plants, soy-beans.* *Journal of Agricultural Meteorology*, Tokyo, 15(1):10-14, June 1959. 2 figs., 6 tables, 12 refs. In Japanese; English summary p. 14. **DWB**—In order to study the relationship between the yields of rice plants and soybeans and climate, the writer studied the variation of climate over a period of years and the growth of rice plants and soybeans, which had been observed at Morioka (1926-1955). The results are summarized as follows: (1) The climate varied from year to year. The variation of the mean air temperature with year was the smallest of the measured meteorological elements and that of the amount of precipitation was the largest. Seasonally, the variations of elements were the largest in the first 20 days in July. (2) There was a close relationship between the yield of rice plants and air temperature and number of hours with sunshine. (3) The yield of soybeans showed a slight relationship with not only air temperature and sunshine but also the amount of precipitation. It was larger than the standard deviation of rice plant yield. (4) There was a close relationship between the dates of first appearance of mean air temperature of more than 20°C and dates of head sprouting of rice plants, and also between number of days of the mean air temperature of more than 20°C and the yield of rice plants. (5) Generally the yield of soybeans was similar to that of rice plants except for the fact that the poor harvest of soybeans was due to the extreme dryness or wetness of the flowering day, which did not exist in the case of the rice plant. *Subject Headings: 1. Climatic effects on rice yield 2. Climatic effects on soybean yield 3. Rice 4. Soybeans 5. Morioka, Japan.—Author's summary.*

10N-395

551.586:551.521.11:551.524.36:632.111:633.18

Andó, Mihály and Vámos, REXSÖ, *A napfénytartam és a hőmérséklet szerepe a rizs barnulósos betegségében.* [The role of sunshine and temperature in the "brusone" disease of rice.] *Időjárás*, Budapest, 63(5):298-304, Sept./Oct. 1959. 3 figs., table, 13 refs. Hungarian and English summaries p. 298. **DLC**—Little sunshine and cool weather were the characteristic features of the catastrophic years of rice crop (1949, 1954, 1955). Sunshine plays a decisive part because abundant sunshine compensates for the harmful effects of low temperatures, and the lack of sunshine counteracts the favorable effects of warm weather. This connection gives an explanation, in interaction with the other known factors (soil, geographic situation, degree of resistance of the plant), of the "brusone" disease which appears extremely erratically as to place and time. *Subject Headings: 1. Agricultural bioclimatology 2. Solar radiation effects on plants 3. Brusone 4. Rice crops.—Authors' abstract.*

10N-396

551.526:633.18

Baba, I.; Takahashi, Y. and Iwata, I. (*all, Nat. Institute of Agri. Sciences*), *Top and root growth of the rice plant as affected by water temperature during daytime and night.* *Journal of Agricultural Meteorology*, Tokyo, 10(1/2):1-3, Dec. 1954. fig., 3 tables. In Japanese; English summary p. 3. **DWB**—A solution culture experiment was carried out to study the growth response of the rice plant to the water temperature during daytime and night in midsummer. The results of the experiment are as follows: 1) When the temperature was higher (37°C) than the optimum (31°C), either during daytime or at night, both the top and the root growth were retarded. Such a retarded growth due to high water temperature (37°C) during daytime appeared to be compensated by lowering the water temperature at night below the optimum (31°C); 2) When the water temperature was higher than the optimum, root rot was increased and the decrease both in the water absorption and in the transpiration was observed; 3) From these results, growth response of the plant to the water temperature treatment seems to have an intimate relationship with both the increase of the root rot and the decrease of the water absorption or decrease of the transpiration caused by supra optimum water temperature. *Subject Headings: 1. Water temperature effects on rice culture 2. Rice growth 3. Rice paddies.—Authors' abstract.*

10N-397

551.586:633.18:632.1

Daigo, Y. and Suzuki, Y., *On the climatic divisions concerning with the weather damages in Japan.* *Journal of Meteorological Research*, Tokyo, 3(2):70-77, Jan. 1951. 3 figs., 4 tables. In Japanese; English summary p. [3]. **DWB**—Weather damage to aquatic rice crops in Japan is investigated from the standpoint of the weather elements causing the damage and the intensity of the damage due to flood, drought, wind and summer heat. Maps of Japan showing the areal distribution of the damage and of its varying intensities are given. *Subject Headings: 1. Rice crop damage 2. Climatic effects on rice 3. Japan.—I.L.D.*

10N-398

551.586:633.18:551.509.5(52)

*Daigo, Y., *The agro-meteorological study on the production index of upland rice in Japan.* *Japan. Central Meteorological Observatory, Tokyo, Memoirs of Industrial Meteorology*, 15(1):1-59,

May 1951. figs., tables, 2 refs., eqs. English summary p. 59. In Japanese. DWB—A comprehensive study with an unusual amount of data covering the period 1902–1937. The author calculates formulas for the meteorological production index of rice in the form of numerous regression equations. The trend in production is shown in the form of broken straight lines. The mean forecasting error is 15% in Japan. The theoretical maximum yield and minimum yield are calculated and the most favorable climatic conditions are specified. *Subject Headings: 1. Rice climates 2. Rice yield forecasting 3. Japan.—A.A.*

10N-399

551.509.58:633.18

Fujita, T., *Forecasting method for the rice yield in the Kamikawa District, Hokkaido.* *Japan. Central Meteorological Observatory, Tokyo. Memoirs of Industrial Meteorology*, 18(2):69–73, March 1955. 3 figs., 4 refs. In Japanese; English summary p. 73. DLC—The rice yield in the Kamikawa District shows a clear secular variation, due to the increase of cultivating areas and to the advance in techniques. Eliminating these effects, the author searched for a relation between the fluctuations of unit area yield and the accumulated equivalent temperature during the growing period of the rice plant, and found a method for forecasting the rice yield in this district. *Subject Headings: 1. Forecasting rice yield 2. Rice yield 3. Kamikawa District, Hokkaido, Japan.—Author's abstract.*

10N-400

551.584.4:633.188

Haneda, E., *Studies on the micrometeorology in paddy field and the collection of rice plants' carbohydrate.* *Journal of Agricultural Meteorology*, Tokyo, 11(4):123, March 1956. In Japanese. DWB—The water in a paddy furnishes the major nourishment of the body of rice plants and greatly affects the collection of carbohydrate of the plants. The experiment described here deals with various types of rice, including the type sensitive to temperature, in relation to the daily variations of micrometeorological conditions during the planting and transplanting periods. The results are presented in detail. *Subject Headings: 1. Rice paddies 2. Rice paddy microclimatology.—K.C.*

10N-401

551.524.37:631.67:633.188

Hanyu, J. and Tsugawa, K. (both, Aomori Agric. Exp. Station), *On the effect of frost protection of paddy rice by irrigation.* *Journal of Agricultural Meteorology*, Tokyo, 10(3/4):125–127, March 1955. 2 figs., 2 tables, ref. In Japanese; English summary p. 127. DWB—Our experiment was made on Oct. 10–11 and 26–27, 1954, to investigate the effectiveness of irrigation to prevent frost injury of paddy rice. Observed elements are as follows: air temperature (height: 10, 20, 40, 60, 80, 100 cm), earth-surface temperature, water temperature of paddy field and stream, wind velocity (height: 10, 20, 40, 60, 80 cm). Weather of observed days was clear and calm or with light breeze. Vertical distribution and ground inversion have minimum temperature at a height of 20–40 cm on the ground surface with no vegetative cover. The effect of irrigation reached about 40–60 cm in height. Air temperature at 100 cm on the irrigated paddy field was generally higher than that of the non-irrigated fields and the reason for this is unknown. Suppose both temperatures are equal, the results show that the irrigation effect reached 60–70 cm in height. Therefore, it is impossible to keep paddy rice from forming frost by such an irrigation method, but it is possible to use it jointly with the smoking or combustion method. *Subject Headings: 1. Frost protection of paddy rice 2. Irrigation effects on frost formation 3. Rice culture.—Authors' abstract.*

10N-402

551.586:551.524.37:633.18

Hasegawa, S. and Nakayama, K. (Kanto-Tosan Agric. Experiment Sta.), *On the damage of upland rice by the cool weather in Kanto District.* *Journal of Agricultural Meteorology*, Tokyo, 15(2):64–70, Oct. 1959. 5 figs., 9 tables. In Japanese; English summary p. 70. DWB—1. The growth and yield of upland rice have been reduced by the cool weather in summer as severely as that of paddy rice in Kanto District. 2. The yield of upland rice was more severely reduced by the cool weather during the earlier part of growing season than by that during the later part of season. The rate of yield reduction of upland rice by the former was greater than that of paddy rice, and the damage was seen all over the district, but it was especially severe in the northern part. 3. The comparison of the growth and yield of upland rice in 1953 (the year of cool weather) with those in 1952 (the normal year) showed that the low temperature during the earlier part of season reduced the height of plants and delayed the tillering, reducing the ear length and number of grains. What was more, the percentage of sterile grain increased and 1000-kernel weight decreased by the delayed heading. The reason why the injury of upland rice is severer than that of paddy rice seems to be as follows: (a) As upland rice is sown and grown between rows of barley or wheat, the tillering is apt to be restricted, especially under unfavorable weather conditions. (b) As the growing season is shorter than that of paddy rice, it is difficult to recover from the cool weather injury even under favorable weather conditions during the latter part of the growing season. 4. For these reasons, the cultural methods for example, continuous cropping, light dressing of fertilizer, and sparse standing, or low

and wet field conditions make the injury severe. 5. The yield reduction of upland rice in the years when the yield of paddy rice was severely reduced by the low temperature during the latter part of the growing season was rather small as compared with the reduction of the yield of paddy rice and the reduction caused by the cool weather during earlier part of season. This is due to the earliness of maturing and the resistant property of upland rice to leaf blight that prevails under cool weather conditions. *Subject Headings: 1. Rice yield 2. Temperature effects on rice yield 3. Kanto District, Japan.—Authors' summary.*

10N-403

551.506.8:633.18:631.67

Hayashi, M.; Hashizume, A.; Inoue, S. and Nomizo, Z. (all, *Chiba Agric. Experiment Station*), *Studies on the two successive rice culture: The early limit of temperature on rice culture view of sprouting of seedlings [and] Regional distribution of the early limit of rice planting in Chiba Prefecture.* *Journal of Agricultural Meteorology*, Tokyo, 13(3):113-116, Feb. 1958. 4 figs., 3 tables. In Japanese; English summary p. 116. DWB—We measured the length and number of sprouting roots of rice seedlings transplanted at different times, and noted the relation between sprouting roots, growth of rice plant and water-air temperature. Owing to the experimental results, we have distributed the regional limit of early rice culture by means of observations made at the main point in Chiba Prefecture. Results are as follows: (1) The rice plant transplanted in the paddy needs about 2°C in minimum water temperature to sprout the roots. The limit of early transplanting time occurs when minimum water temperature stands at 9°C. (2) 7°C in minimum air temperature can be substituted for 9°C minimum water temperature, because minimum air temperature is about 2°C lower than minimum water temperature. (3) We distributed the regional limit of early rice culture by means of the minimum air temperature of each of five days in March and April. The earliest is the first five days in April in the Southern coast region, and the latest is the fifth five days in April in the Northern interior region. (4) As a simple method, if we use the mean air temperature instead of the minimum air temperature for its distribution, it is about 12°C in the coastal region and about 2.5°C in the interior region each five days in spring. *Subject Headings: 1. Rice seedlings 2. Rice culture 3. Rice phenology 4. Chiba Prefecture, Japan.—Authors' summary.*

10N-404

551.511.13:551.554:551.571:581.132:633.1

Inoue, E.; Tani, N.; Imai, K. and Isobe, S. (all, *Div. of Met. Nat. Inst. of Ag. Sci.*), *The aerodynamic measurement of photosynthesis over a nursery of rice plants.* *Journal of Agricultural Meteorology*, Tokyo, 14(2):45-53, Oct. 1958. 7 figs., 2 tables, 12 refs., 5 eqs. In Japanese; English summary p. 53. DWB—The aerodynamic method of measuring the rate of photosynthesis over cultivated fields, which makes use of the equation of turbulent transfer and has been applied successfully to the limitless wide fields, should be applied very cautiously, to the narrow fields of limited dimension such as a nursery of rice plants. Two possible alternative methods are presented. One is the fluctuation method making use of the mean product of the vertical components of wind velocity fluctuations and the CO₂ concentration fluctuations; and the other is the traverse method which makes use of the vertical integration of the horizontally flowing CO₂ flux. The aerodynamic method has been applied on a limited scale to a nursery of rice plants 20 cm high with a great deal of caution, in order to avoid meeting anticipated difficulties. The profiles of air temperature and humidity over the nursery were obtained during almost an entire day in June 1957. The net radiation flux was obtained simultaneously by means of a Beckman-Whitley net radiometer. The assimilation type of concentration profile during the day, characterized by increasing CO₂ concentration with height; and the respiration type at night, characterized by decreasing concentration with height, have been obtained. All of the profiles have been compared with the logarithmic laws, and the relevant zero-plane displacement and roughness length have been obtained as 20 cm and 1 cm, respectively. The fluxes of turbulent transfer of heat, water vapor and CO₂ have been calculated by the aerodynamic method and compared with each other. The amounts of heat energy required for the evapotranspiration and for the photosynthesis of rice plants have been also calculated and the heat budget of the net radiation flux has been considered briefly. *Subject Headings: 1. Photosynthesis 2. Rice culture.—Authors' abstract.*

10N-405

551.586:633.11/18

Inoue, E. (*Div. of Met., Nat. Institute of Agricultural Sciences*), *Energy Budget over fields of waving plants. (Studies of the phenomena of waving plants ("HONAMI") caused by wind, Pt. 5).* *Journal of Agricultural Meteorology*, Tokyo, 14(1):6-8, July 1958. 2 tables, 10 refs., 5 eqs. In Japanese; English summary p. 8. DWB—Taking the relationship of plant assimilation into account, the contribution of three factors: heat convection, evapotranspiration and assimilation, to the energy budget over a paddy and a wheat field has been dealt with. The fluxes of heat, vapor and carbon dioxide are measured aerodynamically under natural conditions and corresponding terms of energy budget are computed and compared with each other. It has been shown that the contribution of the assimilation factor to the energy budget is sometimes fairly significant, although almost always it

is much smaller than the contribution of the two other factors. (For Pts. 1-4 see 9.10-208-9.10-211 Oct. 1958; 10.3-213, Mar. 1959, MAB.) *Subject Headings:* 1. Energy budget 2. Waving plan phenomena 3. Rice paddies 4. Wheat fields.—*Author's summary.*

10N-406

551.573:551.579:633.18:631.6

Kanescaki, S. (College of Agriculture, Univ. of Osaka Prefecture), *Evaluation of evapo-transpiration from a paddy field.* *Journal of Agricultural Meteorology*, Tokyo, 12(1):30-32, July 1956. figs. 4 tables, 4 refs. In Japanese; English summary p. 32. **DWB**—The evaluation of evapotranspiration was taken over a paddy in order to examine the utility of THORNTHWAITE's method based on aerodynamic considerations. The values of the specific humidity and total run of wind are obtained with the aid of the relatively simple apparatus, namely, thermocouple psychrometer and Robinson type small anemometer and are shown in a table. Hourly values of the rate of evapotranspiration were evaluated from an equation by taking the zero-plane displacement $d=47$ cm for the reasonable value from the observations and compared with the values of the direct measurement. The present experiment suggests that the practical application of THORNTHWAITE's method will make it possible to evaluate the evapotranspiration from natural surfaces by improving the method of observation. *Subject Headings:* 1. Evapotranspiration over a paddy 2. Thornthwaite's method 3. Rice paddies.—*Author's abstract.*

10N-407

551.515.2:551.556.2:633.18(52)

Kawamata, M.; Tsukijima, Y. and Sato, T. (Kagoshima Prefectural Agric. Exp. Station), *On the effects of shelter-hedge, alternately planted Miscanthus Sinensis Anderss var. condensatus Makino and Pennisetum purpureum Schumach, for two side of upland rice field against typhoon.* *Journal of Agricultural Meteorology*, Tokyo, 13(2):53-55, Oct. 1957. 2 figs., 2 tables, 6 refs. In Japanese; English summary p. 55. **DWB**—The experiment on the effects of shelter hedge against typhoons, alternately planted *Miscanthus sinensis* Anderss var. *condensatus* Makino and *Pennisetum purpureum* Schumach, for two sides (N-S, E-W) of an upland rice field was carried out in the summer of 1956. Results, presented in detail, show that this shelter hedge was very effective as a protection against typhoon damage. *Subject Headings:* 1. Shelter belt protection against typhoons 2. Typhoon damage 3. Rice culture 4. Japan.—*From authors' summary.*

10N-408

551.586:633.18

Kimura, Y. (Aomori Agric. Experiment Station), *On the bad harvest type of rice in Japan.* *Journal of Agricultural Meteorology*, Tokyo, 6(3/4):119-122, Aug. 1951. 2 tables, 4 refs. In Japanese; English summary p. 122. **DWB**—The author refers to earlier papers in which he presented statistical data on bad rice harvests in all the 46 prefectures of Japan, over periods ranging from 60-71 yrs. In the present paper a regional classification and description of 3 different types of bad harvest are offered. The average effect of the occurrence of one, two, or all three types is indicated. It is pointed out that thirty times, in the course of sixty yrs, bad harvests occurred in as many as six prefectures of Japan. *Subject Heading:* 1. Rice yield.—*G.T.*

10N-409

633.18:631.67

Kobayashi, Shigeki, *On the varieties of the rice plants cultivated in the Kamoike and the Gamagawara area, Suwa basin.* *Journal of Agricultural Meteorology*, Tokyo, 11(3):100-102, Dec. 1955. 2 figs., 2 tables. In Japanese; English summary p. 102. **DWB**—The area under consideration comprises 885 neatly arranged, about tennis court dimensioned paddies, several gentle brooks, numerous straight foot paths and cart roads together with about a dozen lotus marshes in a region 1.5 km x 0.6 km in the Delta Plain south of Lake Suwa. In the autumn of 1935 the writer investigated the variety of the rice crop cultivated in each field, which he entered on a map of 1:7000. The numerous tiny hatched tetrahedrons were the paddies where the variety styled "Aikoku No. 20"—strong, manure-resistant and pest-resistant—was cultivated, the scattering black patterns were the lotus marshes and the rectangles without any hatching were mostly planted with the variety styled "Sekitori" (in Jap.) which yields good qualified rice but is weak against the attack of pests. In order to scrutinize the general tendency of the distribution, he twice dealt with Fig. 1 after KATSUE MISAU's method, the result of which is shown in Fig. 2. The Arabic numerals in the figure indicate the average percentage of the rice fields planted with "Aikoku No. 20" with a unit of 10%. Although the appearance of this region is completely flat, there exist, however, slight differences in elevation. The area where the "Aikoku No. 20" were prevalent—the centers of which were located at the northeast and the northwest sectors of Fig. 2—coincides with the lowest therefore, sometimes water-stagnant fields which were formerly irrigated with nitrogen-rich water from many wells excavated there. This fact indicates that the variety of the crop is sometimes of good service in revealing the regional characteristics of a given area. *Subject Headings:* 1. Rice culture 2. Suwa Basin, Japan.—*Author's abstract.*

10N-410

551.524.2(52):551.586:633.18

Kurashige, K. (Morioka Met. Station), **Correlation between rice crop and 5 days mean temperature in Tohoku districts.** *Journal of Agricultural Meteorology*, Tokyo, 6(3/4):123-125, Aug. 1951. 7 figs. In Japanese; English summary p. 125. **DWB**—It is known from T. IKEDA's study of 1936 that the correlation coefficients between rice crop and 5-day mean temperature from July to Sept. have two maxima in Iwate prefecture, that is, in the early and later parts of Aug. Regarding the early maximum it was ascertained in 1940 that it is due mainly to the physiology of rice. The same problem was investigated all over Tohoku District and it was found that the correlation coefficients (γ) bear a relation to the coefficients of the variation of 5-day mean temperature. The same series of the correlation coefficients have been computed and are presented in a graph. *Subject Headings*: 1. Temperature effects on rice 2. Rice 3. Tohoku District, Japan.—*Author's abstract.*

10N-411

551.525:551.526:633.18

Kurihara, K. and Matsuyama, M., **The relation between the water and earth temperatures and the methods of planting of aquatic rice.** *Japan. Central Meteorological Observatory, Tokyo, Memoirs of Industrial Meteorology*, 18(2):74-77, March 1955. 2 figs., 2 refs. In Japanese; English summary p. 77. **DLC**—There are three methods of planting of aquatic rice, namely, square planting, rectangular planting extending from south to north and that extending from east to west. The authors observed the water and earth temperatures for the three cases of planting from June 1-Aug. 3, 1953, and found that the rectangular planting extending from south to north gave the highest temperatures, and the square planting the lowest. Next, it was found that the yield of rice agrees with temperature. *Subject Headings*: 1. Rice culture 2. Rice planting methods—water and soil temperature relationships 3. Rice yield—temperature relationships.—*Authors' abstract.*

10N-412

551.586:551.524.36:633.18

Kusakabe, Masao (Central Met. Observ.), **Agro-meteorological study on the locality of the crop damage in Japan, Pt. 5. Summer cool damage of the paddy rice.** *Journal of Agricultural Meteorology*, Tokyo, 9(3/4):103-106, Aug. 1954. 2 figs. In Japanese; English summary p. 106.—This is an example of agrometeorological study on the locality of the damage caused by a cool summer, the failure in the yield of rice crops in Iwate Prefecture was studied. It was shown that the distribution of localities where the most severe damage in the yield of rice crops occurred, is quite similar to the distribution of the average number of cool days with a daily minimum temperature less than 15°C. *Subject Headings*: 1. Rice yield 2. Temperature effects on rice yield 3. Iwate Prefecture, Japan.—*H. Arakawa.*

10N-413

551.586:551.524.32:633.18:581.14

Kusakabe, M. (Fukuoka Dist. Met. Obs'y.), **Air temperature in growing stage of paddy rice, studied in Fukuoka as a sample.** *Journal of Agricultural Meteorology*, Tokyo, 14(1):15-18, July 1958. figs., tables. In Japanese; English summary p. 18. **DWB**—The long range averages of monthly mean temperature for July and Aug. and their standard deviations which greatly affect the growing conditions of the rice plants, at several stations in Fukuoka Prefecture, are presented. In Fukuoka Prefecture according to the results, we have no such cool summer damage to which Northern Honshu and Hokkaido are often subject, but contrarily have some hot weather damage. In order to provide some basic data for planning to grow the better types of rice, the fluctuations in the long range averages of the 10-day mean temperature, their standard deviations, and some other climatic elements for Fukuoka are studied, along with the daily temperature over the period of transplantation or the earlier crop and over the earing and flowering periods for the later crop. Then, it is made clear that, as to the later crop, the cold weather damage to the rice plants during the earing and flowering periods will rather often occur here in the future. *Subject Headings*: 1. Rice culture 2. Temperature effects on rice 2. Fukuoka Prefecture, Japan.—*Author's summary.*

10N-414

551.579.5:633.18

Lockard, R. G., **The effect of depth and movement of water on the growth and yield of rice plants.** *The Malayan Agricultural Journal*, Kuala Lumpur, 41(4):266-281, 1958. 3 figs., 12 tables, 7 refs. **DLC**—The results of three experiments carried out in 16 cement tanks are reported. Experiment 1 included six varieties of paddy rice and eight different water control treatments. Experiment 2 was carried out on one variety with four water control treatments in a Latin square design. No. 3 was carried out on two varieties with four water control treatments in a Latin square design. Increasing the depth of water appeared to decrease the number of tillers formed and, thereby, the yield. Neither the rate of lateral movement of water nor the presence of stagnant water had any significant effect on the yield of rice. Plants grown in tanks covered with plastic sheeting behaved quite differently from plants in uncovered tanks. Plants in covered tanks were larger, had longer ears, had fewer tillers, but did not yield less than plants in uncovered tanks. Varying the water depth or rate of water movement did not appreciably alter the length of physio-

logical stages in the development of the rice plant. *Subject Headings:* 1. Rice culture 2. Rice yield 3. Irrigation experiments.—*Author's summary and conclusions.*

10N-415

551.586:633.18:631.5 551.311.1(666.3)

Mouton, J. A., *Riziculture et déforestation dans la région de Man, Côte d'Ivoire.* [Rice cultivation and deforestation in the region of Man, Ivory Coast.] *L'Agronomie Tropicale*, Nogent-sur-Marne, 14(2):225-231, March/April 1959. figs., 3 tables, 8 refs. **DLC**—Account of the ecological economic and ethnographical conditions of rice cultivation in the piedmontese region of Man, Ivory Coast. Stress is laid on climatic variations: decrease of rains favorable to agriculture, increase of the violence and duration of the dry season. It shows also how the HÉNIN erosion index can be used as a cultural influences index. The erosion index of HÉNIN is given by $I^e = \frac{P \times p}{j}$, where P is the annual rainfall code, p the code of the absolute monthly maxima and j the annual number of rain days. *Subject Headings:* 1. Rice culture 2. Climatic effects on rice 3. Hénin erosion index 4. Ivory Coast.—A.V.

10N-416

551.586:551.521.11:633.18:519.24

Matsuda, A. (*Fac. of Agric., Kyushu Univ.*), *Statistical studies between the rice-culture and meteorological variants in warm districts, Pt. 1. Journal of Agricultural Meteorology*, Tokyo, 15(1):15-20, June 1959. 4 figs., 4 tables, 6 refs., 11 eqs. In Japanese; English summary p. 20. **DWB**—The method of multiple correlation is applied to estimate the effect of weather variants represented in monthly units of time, on rice yields for the 20 yrs from 1919-1938, in Fukuoka. The sunshine duration in Sept. and the mean temperature in Aug. are found to be most important variants and a good result was obtained by correlating the regression of yield with these two variants. However, when the weather-crop relationship is applied to the study of rice culture or rice forecasting we had better consider not only the total amount of weather variants represented in monthly units of time, but also their distribution during the month. Therefore, the growing season for the 120 days, July-Oct., is divided into 10-day intervals and the effect of the sunshine duration in each interval on the yield is estimated by R. A. Fisher's method of orthogonal polynomials. It is shown that the sunshine duration in the second 10 days of July and the first and second ten days of Sept. has a more positive effect than the other periods. On the other hand, that in Oct. has rather a negative effect. *Subject Headings:* 1. Rice culture 2. Meteorological effects on rice 3. Fukuoka Prefecture, Japan.—*Author's summary.*

10N-417

551.586:551.553.11:551.510.41:551.464:633.18

Nakagawa, Y. and Tsuboi, Y., *On the influence of briny wind upon the paddy rice at earing stage. Journal of Agricultural Meteorology*, Tokyo, 11(1):9-11, July 1955. figs., 5 tables, 3 refs. In Japanese. **DWB**—A typical ear was placed in a briny solution in a wind tunnel and afterwards it was given a wind treatment (wind velocity at 10 m/s) for 4 hrs. The various results in wind only, briny wind, brine as well as water treatment afterwards, were investigated, during the month of Sept. 1954, and the results are shown. The contents of NaCl in an ear at ripening stage was found to be about 16-25 mg and Cl was 10-15 mg measured by the Mohr method. However, these amounts would not be enough to cause damage, if wind treatment is properly conducted. In the discussion of the effect of briny wind on the ripe grain, the authors have concluded in the experiment that the prevention of damage is found in the following facts: finding out the movement of NaCl from the sea wave, knowing the condition of dry-wet in an ear, the amount of NaCl attached on an ear; and the wind velocity and the distance from seashore to paddy rice. *Subject Headings:* 1. Biometeorology 2. Sea breeze effects on rice crops 3. Rice paddy micrometeorology 4. Agrometeorological conditions.—K.C.

10N-418

551.584.42:551.552:633.18

Nakagawa, Y. (*Div. of Met. Nat. Inst. of Agric. Sciences*), *Studies on the air flow amongst the stalks in a paddy field (Preliminary Report).* *Journal of Agricultural Meteorology*, Tokyo, 12(2):61-63, Oct. 1956. 2 figs., 2 tables, 4 refs., eqs. In Japanese; English summary p. 63. **DWB**—Recently, studies on the wind over cultivated fields have been put forward by INOUE and others; however, few studies on the air flow among the stalks have been carried out. The author describes the results obtained primarily of the velocity of the horizontal air flow, intensity of turbulence and the scale of turbulence among the stalks in the rice paddy of Mishima (Shizuoka Pref.) on Aug. 29, 1955. Making use of the hot wire anemometer (platinum, diameter 0.04 mm, length 50 mm), the horizontal components of the air flow among the stalks at the height of 40, 55, 70, 85, 100 cm are recorded for the average time of 90 sec. The results are as follows: 1) The velocity of the air flow among the stalks at each height is shown to be from 12 to 22 cm/s, in spite of 220 cm/s at 200 cm height; 2) The intensity of turbulence is nearly constant with height; 3) The passage time of the largest horizontal turbulence as obtained at each height is given and the scale is calculated; 4) Roughness parameter

estimated from the distribution of wind velocity measured by a small Robinson anemometer at the most prosperous stage of tillering in the paddy. The ratio is found to be 0.39–0.42, which is compatible with 0.35–0.39, reported previously at same stage of development of rice plants. *Subject Headings:* 1. Air flow through rice crop 2. Rice paddies 3. Mishima, Japan.—*Author's abstract.*

10N-419

551.586:633.18

*Nakahara, M. and Mitsudera, M., *The climate and the rice yield in Sado Island (Studies on the microclimate of Japan, Pt. 1).* Japan. Central Meteorological Observatory, Tokyo, *Memoirs of Industrial Meteorology*, 16(1):1–17, Aug. 1952. 12 figs., 10 tables. In Japanese; English summary p. 1.—Climatic data are presented for Sado Island and analyzed in conjunction with corresponding fields of rice crop. The data have been collected by the authors since 1946. They represent the first effort in an extensive investigation, with the final objective of describing agroclimatic conditions throughout Japan. *Subject Headings:* 1. Agricultural climatology 2. Climatic data 3. Rice culture 4. Sado Island, Japan.—*G.T.*

10N-420

551.586:633.18

Nakahara, M. and Mitsudera, M. (both, Chiba Univ. and Met. Res. Inst.), *Application of factor analysis to the yield of rice-crop experiments, Pt. 3.* *Journal of Agricultural Meteorology*, Tokyo, 3(3):86–88, Feb. 1958. 3 figs., 3 tables, 6 refs., eqs. In Japanese; English summary p. 88. (For Pt. 1, see 10.1–333, Jan. 1959, *MAB*.) DWB—Using method explained in our previous papers, we have analyzed the growth of rice plant height at Taisho (July 22nd every yr) measured at the twenty agricultural experiment stations of Japan covering the period of 30 yrs from 1911 to 1940 and obtained factor load diagrams as shown in figures and tables in the text. We could not clarify what factor loads were, but they were the fundamental data of our further research. *Subject Headings:* 1. Rice culture 2. Climate and crop yield 3. Taisho, Japan.—*Authors' summary.*

10N-421

551.524.3:633.18(437)

Mesároš, J., *Pestovanie ryže na Slovensku a vplyv počasia na jej vzrast.* [Effect of weather on rice crops in Slovakia.] *Meteorologické Zprávy*, Prague, 7(2):36–37, 1954. 2 graphs, 5 refs. Russian and German summaries p. 36. DLC—Growing rates of rice plants and corresponding variations of water temperature are plotted against a cumulative atmospheric temperature scale, for rice planted on April 22 and May 28. Examination of the two graphs shows that cumulative temperature amount is not the only factor influencing the ripening of rice, but strong temperature fluctuations, sunshine duration, and temperature during the principal phenological phases are also decisive. The climate of southern Slovakia is eminently suited for the growing of rice and much better yield than at present could be obtained by improving farming methods. It is a general belief that rice growing is new in Slovakia; this is not so, as documented evidence testifies to the existence of rice fields as early as 1650. *Subject Headings:* 1. Temperature effects on rice 2. Rice yield 3. Czechoslovakia.—*G.T.*

10N-422

551.525:633.18:632.7

Nishiuchi, H. (Naniwa Univ., Faculty of Agriculture), *An instance of the relation between the soil temperature and resistance of paddy to the damage by disease and insect.* *Journal of Agricultural Meteorology*, Tokyo, 11(3):95–96, Dec. 1955. 2 figs., 3 tables. In Japanese; English summary p. 96. DWB—It has been said that the northern bank of the Haruki river, being close to Beppu City, had been suffering considerably more damage by blast and rice stem borers than the southern bank. The comparative microclimatic observations of air and soil temperatures were made in two fields, Jan. 3 and 4, 1945. As a result of these observations, it was confirmed that the fields on the southern bank showed higher soil temperatures than those on the northern bank. It was the writer's understanding that the greater amount of damage in summer to the plants in paddies on the northern bank and the lesser amount of damage to plants in paddies on the southern bank were due to greater resistance of plants on the southern bank to disease and insect damage because of the higher soil temperatures in summer. *Subject Headings:* 1. Soil temperature effects on rice 2. Rice resistance to insect damage 3. Rice paddies 4. Haruki River area, Japan.—*Author's abstract.*

10N-423

551.524:551.586:633.18

Okamoto, K.; Izumi, S.; Kodaka, S. and Oka, Y., *On the relation between the air temperature and ripening condition of Senbon-asahi (paddy rice) at Konosu, Saitama prefecture.* *Journal of Agricultural Meteorology*, Tokyo, 11(1):1–2, July 1955. fig., 2 tables, 4 refs. In Japanese; English summary p. 2. DWB—When maximum and minimum temperatures become about 20°C and 10°C respectively at ripening stage, Senbon-asahi (paddy rice) which is cultured at Konosu district is expected to be brown rice in about 80% of the grains from the fertilized caryopsis. But when the maximum air temperature goes under 20°C, 45 days after heading, the percentage of brown rice falls below 80%. Then, when the air temperature goes down to the above value 40 days after heading,

the percentage of brown rice falls suddenly and imperfect ripening grains increase significantly.
Subject Headings: 1. Rice culture 2. Temperature effects on rice 3. Konosu District, Japan
 —Authors' abstract.

10N-424

551.586:633

Okanoue, M. and Ichikawa, M. (*Govt. Forest Exp. Station*), On the effect of weather, especially air masses, and Baiu front in summer upon the harvest of rice in Japan. *Journal of Agricultural Meteorology*, Tokyo, 7(3/4):79-82, Nov. 1952. fig., refs. In Japanese; English summary p. 82.—The distribution of air masses in summer is investigated and the following results connected with rice physiology are obtained: In a good harvest year, the Ogasawara air mass prevails almost throughout July and Aug. However, in a poor harvest year the Okhotsk air mass or the Siberian air mass prevails frequently in summer, generally producing cold, cloudy and wet weather. Due to this bad weather, the harvest of rice becomes poor not only in northeastern but also in western Japan. Therefore, if a poor harvest is forecast in the Northeast, we should also expect it in the West. *Subject Headings:* 1. Weather effects on rice yield 2. Bai-u 3. Rice yield 4. Japan.—From authors' abstract.

10N-425

633.11

Ota, Y., On the estimation of rice-crop by measuring the weight of rice plants. *Japan. Meteorological Agency, Tokyo, Memoirs of Industrial Meteorology*, 20(2):23-24, Jan. 1957. 2 figs., table. In Japanese; English summary p. 24.—For estimation of the size of the rice crop in a quarter acre rice field, the author has tried a method of measuring the weight of grains contained in an ear of a rice stalk. Application of this method to 49 cases of rice production in Shizuoka Prefecture in 1953 has proved this method to be convenient and effective. *Subject Headings:* 1. Rice crop yield estimation 2. Shizuoka Prefecture, Japan.—Author's abstract.

10N-426

551.526:633.11

Ozawa, Y.; Honda, Isao; Miyamoto, K. and Chiba, G., Studies on the water temperature distribution in a small district, Pt. 1. *Journal of Agricultural Meteorology*, Tokyo, 11(2):57-60, Oct. 1955. 2 figs., 2 tables, 3 refs. In Japanese. DWB—The village of Shichige-shuku, located on the border line of Miyagi, Fukushima, and Yamagata Prefectures, sea level of 295-600 m, attempted to set up a regional division of the paddy according to the flume water temperature. Daytime observation of water temperature took place in 26 rivers and in 77 flumes with the aid of actinometer, mercury thermometer, and recording thermometer, Aug. 18 and 19, 1954. Regional division of the paddy according to flume, low water, semi-low water, standard river, and high water is shown in a chart. The village was divided into East and West regions, and the characteristics of seasonal phenomena in the harvest, good and bad were compared. *Subject Headings:* 1. Flume water temperature 2. Water levels 3. Japan.—K.C.

10N-427

551.586:633.11

Sato, S. (*Kyushu Agr. Exp. Sta.*), A climatological investigation on AKIOCHI-phenomenon in culture of paddy-rice (1). *Journal of Agricultural Meteorology*, 7(2):57-58, June 1952. 3 tables. English summary p. 58.—The effect of climate upon "Akiochi" a phenomenon in which the promising growth of rice ends in a poor harvest in autumn, was investigated by growing the same variety of rice on three different types of soil and in three different local climates. The South Kyushu climate characterized by warm temperature with a small daily range, seems to be one of the causes of "Akiochi." *Subject Headings:* 1. Climatic effects on rice 2. Rice yield 3. "Akiochi" phenomenon 4. Japan.—I.L.D.

10N-428

551.584:551.525/6:633.11

Sato, S. and Funahashi, Y. (*both, Kyushu Agric. Experiment Station*), Studies on the methods of lowering the field-temperatures in the common-cultivation of rice in warm districts of Japan. Pt. 1. *Journal of Agricultural Meteorology*, Tokyo, 13(3):89-92, Feb. 1958. 2 figs., 2 tables. In Japanese; English summary p. 92. DWB—One of the writers, SATO has already reported on the temperature lowering phenomenon caused by prevention of solar radiation penetration into the water of the paddy and recognized the favorable effects of that technique upon the rice plants in late cultivation (transplanting on Aug. 4, 1955). In 1956, the technique above mentioned was adopted in common cultivation of rice (transplanting on July 2). The experimental plots are: (A) clear water, (B) carbon black powdering, and (C) carbon black suspension. In (B) and (C) plots, the daily maximum temperatures at every vertical position of water- and soil-strata are lower than those in plot (A). The temperature lowering is remarkable in late July and in early Aug. The phenomenon continues for some days after the end of these techniques. The growth and yield of rice in the three plots will be outlined in the 2nd report. *Subject Headings:* 1. Rice paddy temperatures 2. Field microclimatology 3. Radiation penetration prevention 4. Japan.—Authors' summary.

10N-429

551.525:6.661.666:551.573:633.18

Sato, S. (*Kyushu Agric. Experiment Station*), **Heat economy in clear-water-plot and in carbon-black powdered plot (Studies on the methods of lowering the undesirable high temperatures of paddy-field in the warm district in Japan, Pt. 2).** *Journal of Agricultural Meteorology*, Tokyo, 13(1):30-32, July 1957. tables, 8 refs., eqs. In Japanese; English summary p. 32. DWB. (For Pt. 1, see 10.1-322, Jan. 1959, MAB.)—The carbon black powder floating on the water surface of the paddy does not check the evaporation at all, but rather accelerates it in the daytime. The heat transfer (to the air layer) and the outgoing radiation from the carbon black film are larger than those from a clear water surface. In the carbon black powdered plot, the energy used for the rise in soil temperature is restricted only to the heat conducted downwards from the water surface. The loss of heat from water- and soil-strata at night in the carbon black plot is as much as that in the clear water plot. These are the main causes of the phenomenon that the soil and water temperatures in the carbon black plot are markedly lower than those in the clear water plot. *Subject Headings: 1. Heat loss of water surfaces 2. Rice paddy temperature 3. Carbon black effects on rice paddy temperature 4. Temperature control of rice paddies 5. Evaporation control 6. Japan.—Author's abstract.*

10N-430

551.5:633.18

Sato, S. (*Kyushu Agricultural Experiment Station*), **The optimum conditions of climate for the rice-culture in the warm district in Japan, Pt. 2.** *Journal of Agricultural Meteorology*, Tokyo, 12(1):24-26, July 1956. 3 figs., table, 3 refs. In Japanese; English summary p. 26. (For Pt. 1, see 7.8-248, Aug. 1956, MAB.) DWB.—The yields of the paddy rice (y) in the warmer districts in Japan are mainly proportional to the sunshine duration (s) in autumn, but are increased or decreased according to the air temperature (t) in summer; the optimum temperature (t_0) averaged in summer is about 27.2°C, and the yields are poor both in cases of cooler summer and too hot summer. The above relationships are expressed by the following equations:

$$y(\text{KAN/TAN}) = 10.1 + 0.27s + 31.87e^{-4.36(t-27.19)^2}$$

$$y(\%) = 9.0 + 0.21s + 25.41e^{-4.32(t-27.2)^2}$$

(note) KAN/TAN = 3.75 kg/1000 m². *Subject Headings: 1. Rice culture 2. Rice yield 3. Rice ecology 4. Japan.—Author's abstract.*

10N-431

551.586:551.556.1:633.18

Shimoyama, T. (*Fac. of Agric., Okayama Univ.*), **Physiological analysis of the reduction of yield of paddy rice plant affected by severe wind or storm.** *Journal of Agricultural Meteorology*, Tokyo, 15(1):1-9, June 1959. 11 fig., 5 tables, 73 refs. In Japanese; English summary p. 809. DWB.—While it is already clearly apparent through many research activities that the deterioration of fertility of paddy rice plants caused by wind damage is particularly striking at period before and after the heading time, the author, too, has confirmed this fact in the investigations of fertility of wind damaged rice plants according to the flowering dates, performed after "Muroto typhoon" in 1934. The author has repeated the wind channel experiments since 1952, using potted paddy rice plants, and has investigated the appearance and developmental mechanism of wind damage under the environment of various treating conditions. To synthesize the experimental results obtained to date, the author can summarize as follows: 1) In the wind damage of paddy rice plants, the severe injury first appears at the portions of leaf, stem and panicle; 2) As these portions discolor, wither and die, the fertility deteriorates. Apparently this may suggest that mechanical injury in itself is the direct cause of wind damage. In fact, it is appropriately assumed that the developmental process of wind damage progresses from mechanical damage to physiological disorder, the former operating as drive factor. Therefore, it is natural that the phases of the damage should be of a highly complex nature. In addition, the phenomenon of water starvation in rice plants is related to the frequent appearance of leaf withering and it retards not only differentiation, development and function of cell tissues of growing region and young ear, etc., but also degrades the subsequent nutriophysiological status of the rice plant, and it results in the destruction of reproductive function. After this stage, water absorptive function is inhibited and absorption, production, translocation and accumulation of inorganic and organic nutritive elements are impeded. The assimilation, respiration and metabolic activities of the plant are disturbed, followed by a gradual transition to general nutriophysiological disorder. In this case, the rain associated with wind exerts a good influence on reducing the wind damage, assuaging the abrasions and lacerations to the tissues of stem and leaf, and preventing excess transpiration. Moreover, a foliage spray of urea or after-dressing is necessary to supply deficient inorganic nutrients. The utilization of other nutrient components in such a form as above mentioned would appear to warrant further study. *Subject Headings: 1. Wind effects on rice yield 2. Rice yield.—Based on author's summary.*

10N-432

551.524.3:633.1

Shiraki, M.; Ohashi, T. and Niwa, I. (*all, Gifu Agric. Experiment Station*), **Effect of different meteorological conditions on the late development stage of rice plant.** *Journal of Agricultural Meteorology*, Tokyo, 13(3):93-96, Feb. 1958. 2 figs., 6 tables, ref. In Japanese; English summary p. 96. **DWB**—In order to investigate the effect of meteorological conditions on the late developmental stage of rice plants, the method of exchanging plants in pots between two stations was adopted, where the diurnal temperature change was respectively large and small. Some results are presented here. *Subject Headings:* 1. Temperature effects on rice 2. Rice.—*Authors' summary.*

10N-433

551.556.1:581.14:633.1

Tsuboi, Y.; Kubo, S. and Fujima, T. (*all, Div. of Met., Nat. Inst. of Ag. Sciences*), **Effects of the wind on flowering and fertilization of rice plant, Pt. 1, Effects of the difference in the time of treatment.** *Journal of Agricultural Meteorology*, Tokyo, 14(3):81-84, Jan. 1959. 2 figs., 5 tables, 3 refs. In Japanese; English summary p. 84. **DWB**—The effects of wind treatment on flowering and fertilization at the time of heading of rice plants in relation to differences in the time of treatment have been studied. The results are summarized as follows: (1) The flowering was accelerated by the wind treatment, but the result fluctuated considerably due to the internal characteristics of the rice plant, i.e., the acceleration of flowering of rice plants when grown under unsatisfactory weather conditions before the treatment, was very extensive and a number of new flowerings was observed even at night. The tendency was not recognized when the weather was favorable before the treatment. (2) The fertilization percentage of rice plants which flowered on the day of treatment differed considerably in accordance with the differences in the time of treatment. The plot having many nonfertilized spikelets corresponded to the plot with many spikelets flowered in the wind. From this fact we assume that the nonfertilization was caused by the direct wind injury of flowers in particular, injury to stamens, pistils, and ovaries. *Subject Headings:* 1. Wind damage to rice 2. Rice.—*Authors' summary.*

10N-434

551.524.4:551.525:633.18

Tsuboi, Yasoji and Honda, Isao (*Natl. Inst. of Agricultural Sciences*), **Some characteristics of temperature distribution in the paddy field being continuously irrigated with cold water.** *Journal of Agricultural Meteorology*, Tokyo, 8(1/2):7-11, March 1953. 4 figs., 6 tables, 4 refs. In Japanese; English summary p. 11.—The horizontal distribution of water and soil temperature and the vertical distribution of air temperature were measured on a clear day in July and Aug. 1952 in a paddy irrigated with cold water. The data are presented in graphs and tables. It is shown that types of vertical distribution of temperature in a paddy are closely related to size and density of the rice plants; and are considerably modified by the water temperature which is greater at night than during the day. *Subject Headings:* 1. Vertical temperature distribution 2. Soil temperatures 3. Rice paddies 4. Irrigation effects on temperature distribution.—*I.L.D.*

10N-435

551.584.42:633.188

Tsuboi, Yasoji and Nakagawa, Yukio (*Natl. Inst. of Agr. Sci., Div. of Met.*), **Study on the relation between the microclimatic characteristics and the growth of rice plant.** *Journal of Agricultural Meteorology*, 9(2):59-62, March 1954. In Japanese; English summary p. 62. 2 figs., 3 tables, eqs.—The relationship between variations in the microclimatic characteristics of a paddy and the various stages in the growth of paddy rice were investigated. Measurements of temperature were made at the beginning and height of tillering and during maturity of plant. Data are given on the vertical distribution of temperature, the diurnal range of temperature and the thermal diffusibility during their various stages. *Subject Headings:* 1. Microclimatic influences on rice 2. Rice ecology.—*I.L.D.*

10N-436

551.556.1:551.571:581.11:633.18

Tsuboi, Y. and Kubo, S. (*both, Div. of Met., Nat. Inst. of Ag. Sciences*), **The change of water-constant and the injury of rice plant by the wind treatment, Pt. 1.** *Journal of Agricultural Meteorology*, Tokyo, 14(3):85-90, Jan. 1959. 4 figs., 3 tables, 7 refs. In Japanese; English summary p. 89-90. **DWB**—In order to make clear the mechanism of reduction of water content in rice plants by wind, we have studied their water content. Results are as follows: (1) The water content of each organ of the rice plant grown under normal conditions increased in order of ear, leaf and stem, and decreased in the same order. (2) When the water supply from the root was intercepted, the plants began to wilt. However, younger leaves showed a small decrease in the water content, and had a great resistance against dehydration. Because the wilting occurs through a slight decrease in water content, it is difficult to measure the decrease at the beginning of wilting. The reduction of water content in the ear was smaller than that in the leaves, but it fluctuated by the number of days after heading. The reduction of water content was smallest in the stem. (3) The critical water content for recovery from wilting was different at the various stages of growth of rice plants.

Before the milky ripe period it was about 50%, and about 60% in the waxy ripe period. (4) The reduction of water content in each organ of rice plants treated by wind have been observed. In a leaf, the reduction of water content was considerably greater in the upper half of leaf blade. No differences in the reduction of water content were recognized between the sites of leaves. The differences of water content between the ears of treated and untreated were not clear in the present experiment. The reduction of water content in the stem was smallest, but when the stem had a young head before heading, it was quite large. Under the conditions of stronger wind and of longer duration of treatment, the reduction of water content was more remarkable. *Subject Headings:* 1. Wind damage to rice 2. Water balance of rice paddies 3. Rice paddies.—*Authors' summary.*

10N-437

551.586:551.556.1:633.18 533.6.07

Tsuboi, Y. and Kubo, S. (*Div. of Met., Nat. Inst. of Agricul. Sciences*), *Effects of wind velocity on the rice plant in the heading stage, Pt. 1. Journal of Agricultural Meteorology*, Tokyo, 14(4):141-144, March 1959. fig., 10 tables, 2 refs. In Japanese; English summary p. 144. DWB—(1) We have studied the effects of wind velocity generated in the wind tunnel on the flowering and fertilization of rice plants at the heading stage. (2) Because the flowering of the rice plants was affected by meteorological factors, such as temperature, humidity and solar radiation, in the present experiment, the effect of wind velocity on the flowering was not clarified. (3) The percentage of abortive grains increased as the wind velocity became higher, and this was more definite in the recessive spikelets. (4) The fertility percentage of spikelets which flowered before the day of treatment was high, and it seemed that the effect of the wind on such spikelets was slight. Recessive spikelets are apt to be affected by wind, but dominant ones are not. Therefore it may be said that the number of recessive spikelets which flower after the day of treatment controls the sterility percentage of the ear. *Subject Headings:* 1. Wind velocity effects on rice 2. Rice culture.—*Authors' summary.*

10N-438

551.586:551.556.4:551.464:633.18

Tsuboi, Y. and Nakagawa, Y. (*Div. of Met., Nat. Inst. of Agricultural Sciences*), *Effects of briny wind on the rice plant in the heading stage, Pt. 2. Journal of Agricultural Meteorology*, Tokyo, 14(4):151-157, March 1959. fig. 4, tables. In Japanese; English summary p. 157. DWB—In order to carry out a study of the injury of rice plants caused by briny wind in its heading stage, rice plants were treated by an artificial briny wind of 12 m/s velocity in a wind tunnel spraying salt water. The results obtained are summarized as follows: 1) The volume of salt which adhered to the ears and leaves of rice plants was closely related to the concentration of salt water that was sprayed. 2) The discoloration of ear, the degree of leaf withering and the degree of sterility were accelerated with the increase of the volume of salt which adhered to the ear. 3) The critical volume of salt necessary to cause the injury was estimated to be about 1 mg per ear in present experiment. 4) It was recognized that the sooner the rice plants treated by briny wind were washed by water and the greater the volume of salt adhering to the rice plants, the greater was the effect of washing. 5) The reduction of rice yield which may occur by briny wind injury seems to be predictable by inspecting the external change in the appearance of the rice plant. *Subject Headings:* 1. Salt spray effects on rice 2. Rice culture.—*Authors' summary.*

10N-439

551.586:551.524.37:633.18

Ujiiie, S.; Saito, T. and Sato, S., *On the injuries of cool weather in rice of Miyagi Prefecture in 1953. Journal of Agricultural Meteorology*, Tokyo, 10(1/2):42-46, Dec. 1954. 5 figs., 3 tables. In Japanese. DWB—The paper has traced the relation of cool weather and growth period of rice, based on extensive cold damage during June-July, Aug. 23-Sept. 21 and Sept. 22, and also later in 1953. The main damage included a plant fever, an abnormal blossom, and unripened grain. An investigation was carried out to show the relation between the change of appearance in the main culm and the weather chart, including monthly and daily sunshine and maximum and minimum temperatures. The differences between budding, seeding, and heading periods of rice plants and, particularly, the quality of grain are discussed. The cool weather between 20.9°C and 16.5°C was studied in relation to its influence on the delay of ear appearance, blossoming and ripening and culm growth. The phenomenon of richness in grain is dependent upon the variation of temperature, because at -10°C the growing process stopped. In addition, the authors discuss the length, width, thickness, and weight of grain compared with the average year's harvest. *Subject Headings:* 1. Frost damage to rice 2. Rice 3. Miyagi Prefecture, Japan.—*K.C.*

10N-440

551.524:633.18

Umeda, S., *On the harvest of rice in Fukushima Prefecture. Japan. Meteorological Agency, Tokyo, Memoirs of Industrial Meteorology*, 20(2):1-12, Jan. 1957. 7 figs., 7 tables, 7 refs. In Japanese; English summary p. 12.—The author has investigated the status of rice harvest in Fukushima Prefecture, using the statistical data of various regions during the last 74 yrs, and the relationship between the regional rice yield and the regional air temperature. The results are as follows:

1) The increasing rate of yield in the secular change is very different, depending on the regions. 2) The increasing rate of yield is somewhat smaller than the decreasing rate. 3) The instability of the harvest is large in the northern part of the coastal region (Hama dōri), in the mountainous district of Abukuma Range, and in the southern part of the central inland region (Naka dōri), and is small in the western inland region (Aizu). 4) The regional difference of yield is large in the years of bad or very bad harvest, and small in the years of above normal harvest. Furthermore, it has become smaller in recent years. 5) The period when the yield is most closely connected with air temperature is July in the western inland region (Aizu), July-Aug. in the central inland region (Naka dōri) and July-Sept. in the coastal region (Hama dōri). 6) The normal harvest nowadays is larger (smaller) in the region where the air temperature in mid-summer is higher (lower) and this relation is not found in former years (1881). 7) The concurrence rate of the harvest is closely related to that of the air temperature deviation. *Subject Headings:* 1. Temperature effects on rice yield 2. Rice yield 3. Fukushima Prefecture, Japan.—*Author's abstract.*

10N-441

551.586:633.18:632.14

Vámos, REXSÖ, "Brusone" disease of rice in Hungary. *Plant and Soil*, The Hague, 11(1): 65-77, June 1959. 6 figs., 3 plates, 2 tables, 19 refs. **DLC**—Brusone causes considerable damage in Hungary in years with cool, sunless summers. The disease occurs only on certain soil types. The observation, which has been made several times, that healthy and diseased plants may be separated in paddies along a straight line, together with histological and biochemical examinations, indicates that the brusone is a soil-borne physiological disease. It has been established by ecological observations and chemical, microbiological, meteorological, histological and physiological investigations that the primary cause of the disease is H_2S . There was considerable less solar radiation in those years when brusone occurred than in those years when it did not. Adequate solar radiation enabled the plant to produce oxygen by photosynthesis which is in excess of that required for respiration, and as a result the H_2S is transformed and the injurious effect prevented. The formation of hydrogen sulphide and its toxic effect on the rice plant are promoted by several factors but especially by cool and sunless weather. In such weather the carbon assimilation of the paddy plant is reduced and the toxic H_2S in the soil is not transformed. In such circumstances the disease may cause disastrous damage to rice plants growing on those soils where the disease is particularly inclined to develop. *Subject Headings:* 1. Rice culture 2. Brusone 3. Climatic effects on rice 4. Hungary.—*Author's abstract.*

10N-442

551.586:631.18:523.74

Watanabe, Tadashi (*Hokkaido Univ.*), Defence of rice cultivation with some reference to the climatic cycles. *Hokkaido Univ. Faculty of Agronomy, Journal*, Vol. 47, 1952. 17 p. 3 tables, 3 diagrs., foot-refs. Abstracted from reprint. **DWB**—After giving a brief historical survey of the development of rice cultivation in Hokkaido the author states that there is a 33-yr cycle in the succession of good and bad rice crops, which he believes to coincide with a similar cycle (BRÜCKNER'S) throughout the world. The 2.1, 4.8, 8.3, and 11.1-yr cycles of solar activity with their least common multiple of 33 yrs are indicated as the ultimate cause of weather and farm crop cycles. Climatic data for Hokkaido (1930-1950) and Northern Japan (1900-1907) and years with bad rice crops in the northeastern districts of Japan are tabulated. The author advocates rice cultivation in Hokkaido by arguing that even when the harvest is bad, rice farms still yield about three times the crop produced on farms growing wheat, barley, potatoes, and the like. *Subject Headings:* 1. Rice 2. Sunspot cycles—crop yield relationships 3. Hokkaido, Japan.—*G.T.*

10N-443

551.521.32:551.525.2:633.18

Yabuki, K. (*Naniwa Univ. Faculty of Agric.*), Absorptivity of paddy field and its effects for water temperature. *Journal of Agricultural Meteorology*, Tokyo, 9(3/4): 121-124, Aug. 1954. 3 figs., 10 refs., 3 eqs. In Japanese; English summary p. 123-124.—In a paddy, solar radiation is absorbed not only by the soil surface, but also by the covering water. So, we must take into consideration the absorptivity of the paddy which includes the absorption by both soil surface and water, but not the reflection. In this paper, absorptivity of the paddy and the varying degree of absorptivity of the soil surface are calculated. For example, the absorptivity of the paddy is 42% and 93% respectively, if the stagnant water is 5 cm deep, and absorptivity of soil surface is 0% and 100% respectively. Some experiments were also made on a model field bearing on the same problem, in which the soil surface of each field was covered with various metal planes 0.1 mm thick having different absorptivity. In the above experiments, as the temperature difference was about 5°, the temperature difference per 10% of absorptivity of the paddy was only about 0.5°C. Nocturnal cooling of water did not differ by the difference in absorptivity of soil surface, and the paddy with the highest temperature in daytime had the highest temperature in the early morning as well. *Subject Headings:* 1. Solar radiation absorption by water 2. Solar radiation absorption by soil in rice paddies 3. Water temperature variations 4. Rice paddies.—*From author's abstract.*

STRAWBERRIES

10N-444

551.586:634.75

Hester, G.; Kronenberg, H. G.; Braak, J. P. and Zeilinga, A. E., **Poor fruit setting in strawberries.** *Euphytica*, Wageningen, 8(3):245-251, Dec. 1959. 4 figs., 5 tables, 4 refs. DA—This is a report on a preliminary investigation of the causes of insufficient fruit setting in the strawberry variety Jucunda, especially its clone JK3. From field experiments in different localities and under different natural conditions it was concluded that raw weather increases the percentage of malformed fruits. The fruit setting of the variety Deutsch Evern was good at all temperatures of the range of 10-26°C, whereas that of Jucunda was only good at 17-26°C. At 14°C and lower the fruit setting in Jucunda was reduced to zero. As this phenomenon is greatly influenced by the growth conditions of the plants, further investigation of this problem will be carried out under controlled conditions. **Subject Headings:** 1. Strawberry culture 2. Climatic effects on strawberries.—*From authors' summary.*

10N-445

551.586:634.75

Jonkers, H., **Accelerated flowering of strawberry seedlings.** *Euphytica*, Wageningen, 7(1):41-46, Feb. 1958. 5 tables, 5 refs. English summary p. 41; Dutch summary p. 45-46. DA, CU, PU—For shortening the life cycle of strawberry plants a combination of seed and plant treatment was applied to seeds and resulting seedlings of the varieties Climax, Jucunda and Deutsch Evern. Of the seed treatments applied, a cold treatment of 16 days at 3-5°C produced very poor germination. After treatment with H₂SO₄, 96% germinated more rapidly and a considerably higher percentage of germination was achieved. Seedlings with three trifoliate leaves cannot be induced to flower by short-day treatment. For an effective short-day treatment of Deutsch Evern at least five, and with Climax and Jucunda at least seven, trifoliate leaves should be formed prior to short-day treatment. The freshly harvested seed from seedlings forced to rapid flowering has normal germinating power. Through a combination of sulfuric acid treatment of the seed and a short-day treatment of the seedlings as soon as the latter have become sensitive, the life cycle can be shortened from 18-24 months to 8-9 months. **Subject Headings:** 1. Strawberry culture 2. Germination.—*Author's abstract.*

10N-446

551.506.8:634.75

Ogorodnikov, B. I., **Utochnenie metoda summ effektivnykh temperatur pri raschete dat zatsvetaniia zemlianiiki.** [A more precise method of effective temperature sums in the calculation of dates of strawberry blossoming.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy*, No. 47(74):86-92, 1956. fig., 3 tables, 3 refs. DLC—The author presents a formula through the use of which more precise dates of strawberry blossoming can be obtained. **Subject Heading:** 1. Strawberry blossom phenology.—A.M.P.

SUGAR BEETS

10N-447

633.63:632.111.5

Corns, W. G., **Improvement in low-temperature resistance of sugar-beet seedlings treated with Dalapon (2,2-dichloropropionic acid).** *Science*, Wash., D. C., 120(3113):346-347, Aug. 27, 1954. 2 tables, 2 refs. DLC—About 65% more Dalapon treated seedlings survived a timed exposure to -10°C than untreated samples. No adverse effect of the chemical on the quantitative growth of the seedlings was observed. **Subject Headings:** 1. Frost resistance of sugar beets 2. Sugar beets.—A. Assur.

10N-448

551.586:632.111:633.63

Fourré, Jeannine, **Action du froid sur les tissus des betteraves sucrières.** [Action of cold on the tissues of the sugar beet.] *Académie des Sciences, Paris, Comptes Rendus*, 247(3):338-339, July 21, 1958. table. DWB, DLC—The author investigates the way in which the various tissues of the beet root resist frost. For this purpose, roots were subjected for 24 hrs to the action of constant temperatures ranging between 0° and -16°C. Histological cuttings were made after warming up to the laboratory temperature. The experiments show that the freezing of beets starts only when relatively low temperatures are reached, and on the other hand that the various tissues do not offer the same resistance to the fall in temperature. **Subject Headings:** 1. Freezing of sugar beets 2. Sugar beets.—A.V.

10N-449

551.586:612

Fourré, Jeannine, **Sur l'emploi de la méthode conductimétrique dans l'étude du gel des betteraves sucrières.** [The use of conductimetric method in the investigation of frost damage to

sugar beets.] *Académie des Sciences, Paris, Comptes Rendus*, 247(7):689-692, Aug. 18, 1958. 2 figs., 1 table, ref. **DWB, DLC**—The author investigates frost damage to sugar beets through using a technique based on measurement of conductivity of tissues. Living cells present a greater resistance to the passage of electric current than dead cells. The results of the measurements make it appear that the electric resistance diminishes as the roots undergo the action of colder and colder temperatures: it passes from 7000 Ω for a beet which has not undergone the action of the cold, to 500 Ω for a root which has remained at -16°C during 24 hrs. This method seems to be very promising both by its rapidity and by its accuracy, with respect to the alteration of the beet cells under the action of low temperatures. *Subject Headings*: 1. Frost damage to sugar beets 2. Sugar beets —A.V.

10N-450

551.586:551.521.16:633.63

Gaastra, P. (*Lab. of Plant Physiol. Res., Agric. Univ., Wageningen, Netherlands*), **Light energy conversion in field crops in comparison with the photosynthetic efficiency under laboratory conditions**. *Wageningen. Landbouwhoogeschool, Mededelingen*, 58(4), 1958. 12 p., 4 figs., 2 tables, 22 refs. Summary p. 11. **DLC**—Equipment has been built enabling the simultaneous recording of the rate of photosynthesis, the transpiration rate and leaf temperature at a widely varying range of light intensities, CO_2 -concentrations, leaf temperatures and air humidity. For sugar beet leaves the relation between the incident light intensity and the rate of photosynthesis has been determined with this technique. The maximum quantum yield was found to be 0.10. In these experiments the efficiency of solar energy conversion in sugar beet leaves varies between 17.6% at low light intensities and 2.2% at full sunlight (considering the spectral region 400-700 $\text{m}\mu$). Combined published data on the production of organic matter in field crops of beets, and on solar radiation, shows that the efficiency of these crops reaches 7-9% in the middle of the season. The analysis, moreover, shows that between 80 and 90% of the total organic matter was produced in only 44.5% of the growing season. During this part of the season (2.5 months) beets are at least as efficient in solar energy conversion as mass cultured algae. Comparison of the estimated photosynthetic rates in sugar beet leaves under field conditions with the actually measured optimum rates at comparable intensities under laboratory conditions, revealed that the photosynthetic rate in the field crop was at least 60% of the optimum rate during a great part of the season. This value has to be considered as a minimum, because some simplifying assumptions lead to an overestimation of the optimum rate at the actual light intensities. Occasionally, very low photosynthetic rates occur, most probably due to a decrease in the photosynthetic activity of the leaf. *Subject Headings*: 1. Sugar beets 2. Light intensity—photosynthesis relationships.—*Author's abstract*.

10N-451

633.63:551.579.5(477)

Kekukh, A. M. and Mikhaïlova, N. I., **Vodopotreblenie sakharnoi svekly v raionakh svekloboieivania Ukrainy**. [Water consumption of sugar beets grown in the sugar beet region of the Ukraine.] *Kiev, Ukraine. Nauchno-Issledovatel'skii Gidrometeorologicheskii Institut, Trudy*, No. 14:24-45, 1958. 10 figs., 6 tables, 18 refs., eqs. **DWB**—The authors establish quantitative indices between the water needs of sugar beets under field conditions and the possible fulfillment of this requirement, in order to establish an economically valuable beet yield in the different physiographic zones of the Ukrainian SSR. The growth method for determining the water consumption of sugar beets is described with the aid of photographs. Under field conditions when the supplies of productive moisture in the meter layer of the soil are around 100 mm the water consumption of beets for a 10-day period during June-Aug. is around 40-50 mm, of which 15% is for inter-row evaporation. On a hot July day when the soil has adequate moisture, a beet field evaporates 10 mm per day. In vegetation vessels, when the given soil moisture is 60% of field capacity, the amount of moisture utilized per individual plant is between 49 and 27 liters. When fertilizer is applied, the efficiency of transpiration increases: unit yield per tuber costs 96 units of water as compared to 121 units without fertilizer. A close relationship has been established between water requirement and moisture supplies. Also a relationship was established between the growth of the root and the moisture in the range up to 100 mm in the meter layer. The criterion of the water supply of beets may consist of the ratio of the sum of water supplies with precipitation to the potential evaporation, computed by the formula of I. I. IVANOV. In the case of optimum moisture supplies this ratio is equal to unity. Such a moisture supply is observed in the north of the line Kamenets Podolski, Kirovograd, Poltava, and Bogodukhov. South of it in the beet cultivation region, the optimum moisture supply may be present only during individual years. Data on the moisture supplies at beginning of sowing and on field capacity of the soil for principal areas of beet cultivation, seasonal variation of transpiration of leaves and of the meteorological variables, total evaporation of a beet field (transpiration+soil evaporation) and evaporation of black fallow soil, etc. are given in tables; a map showing the water provision for beets in the beet growing areas of the Ukraine, is included. *Subject Headings*: 1. Sugar beet growth 2. Soil moisture consumption of sugar beets 3. Water supply for sugar beets 4. Ukrainian S.S.R.—I.L.D. and authors' conclusions.

10N-452

551.524.31:551.43:633.63

*Lascombes, Georges, *Action des variations quotidiennes de température sur le métabolisme acide et le cycle de développement de la betterave cultivée à haute altitude*. [Effect of daily temperature variations on glucose metabolism and the development cycle of beets cultivated at high altitudes.] *Académie des Sciences, Paris, Comptes Rendus*, 235(16):894-896, Oct. 20, 1952. DWB—Tests made at the Alpine garden of the Observatory on the Pic du Midi de Bigorre (2850 m or 9360 ft) and at Toulouse with beet roots show that the effect of large diurnal temperature ranges is to increase the soluble glucose content of the tops and to impoverish the roots. This is due to the slowing down of the flow of nutrients from the tops to the roots during the night at high altitudes. Feeding at the coldest time of the night somewhat restores the balance, as shown by comparative tests. *Subject Headings*: 1. Temperature effects on sugar beets 2. Sugar beets 3. Alpine effects on sugar beets.—M.R.

10N-453

551.586:633.63

Séchet, Jean, *Action des basses températures sur les semences de betterave en germination*. [Action of low temperatures on germinating beet seeds.] *Académie d'Agriculture de France, Paris, Comptes Rendus*, 45(17):879-881, Dec. 16, 1959. 2 refs. DA—Study of the action of relatively low temperatures, in the range of 2°C, on germinating beet seeds. In his comparison between various lots, the author considers one untreated lot and lots which have undergone low temperature treatments for periods varying from 30-57 days. Plants submitted to low temperatures during 30 days, produce a yield clearly superior to that of the other lots. This result suggests the value of such a treatment in order to improve the crops, at least in the case of late seedings. *Subject Headings*: 1. Sugar beets 2. Low temperature effects on seed germination.—A.V.

SUGARCANE

10N-454

551.515.2:633.61:632.117.1(698.2)

De Sornay, A., *Resistance of sugarcane varieties to cyclones*. *Revue Agricole et Sucrière de l'Ile Maurice*, Port-Louis, 37(4/6):241-251, July/Dec. 1958. 4 tables. DA—In 1958, Mauritius suffered from two destructive cyclones. An evaluation of the damage was made in the fields surrounding anemometers. Damage was assessed by counting the broken stalks in patches 10 ft long. Observations have been made on the beating down of canes and the tearing of leaves. A research program has been planned for the future. Experiments will be undertaken in order to limit the effect of cyclones. One should try the method of cultivating plants of sensitive varieties and of resistant varieties in alternate areas or mingled in the same furrows. *Subject Headings*: 1. Sugarcane cultivation 2. Cyclones 3. Mauritius.—A.V.

10N-455

551.586:633.61(698.2)

Rouillard, Guy, *L'expérimentation aux champs à l'Institut de Recherches Sucrières*. [Field experimentation at the Sugar Industry Research Institute.] *Revue Agricole et Sucrière de l'Ile Maurice*, Port-Louis, 37(4/6):252-258, July/Dec. 1958. 1 table. DA—With advances in agriculture, scientific experimentation is rendered more and more necessary, and the methods employed have to be more accurate. To that end, experiments must be duplicated all over the country and repeated during a certain number of years. Biological control and studies of climatic factors influencing growth are an indispensable adjunct of field experimentation. At the Mauritius Sugar Research Institute 175 experiments are under way, more than one third of which are variety trials. Experiments to compare overhead to surface irrigation are under way at Palmyra and new studies on sugarcane cultivation will soon be started. *Subject Headings*: 1. Sugarcane cultivation 2. Climatic effects on sugarcane cultivation 3. Mauritius.—Author's abstract.

10N-456

551.515.2:633.61(698.2)

Swan, A. D., *The effects of cyclones on the sugar crop in Mauritius*. *Revue Agricole et Sucrière de l'Ile Maurice*, Port-Louis, 38(4):172-173, July/August 1959. 2 figs.—A method is developed to estimate the normal sugarcane crops in Mauritius Island if no cyclones occur. Since the number of years which are free from cyclones is too limited, years of one cyclone, 1870-1940, are taken to draw the curve of the progress of the normal crop. Figures show the actual cyclone damage corrections for years of one cyclone, the general structure on which these corrections are based, and their application in drawing the curve of normal crop development. *Subject Headings*: 1. Cyclone effects on sugar crops 2. Sugarcane cultivation 3. Mauritius.—A.V.

10N-457

551.524:633.61:581.14

Thomson, G. M., *The effects of heat treatment on the germination of sugar-cane setts*. *Revue Agricole et Sucrière de l'Ile Maurice*, Port-Louis, 37(4/6):235-240, July/Dec. 1958. 7 tables. DA—This article is based on an experiment carried out in order to study the effects of the various com-

binations of time and temperature on the germination of setts, through hot water treatment against stuntedness. It appears that increasing the duration of the treatment to more than two hrs. at a temperature below 50°C does not always stop the bad effects of the treatment; this depends on the varieties. It might thus be valuable to establish various combinations of time and temperature for the different varieties, so as to obtain a better sowing of setts after the treatment, still taking into account that the main purpose is to inactivate the virus. *Subject Headings: 1. Sugar cane cultivation 2. Germination of setts.—A.V.*

TEA

10N-458

551.524.35:633.7

Chayamichi, Hisakichi (*Makurazaki Met. Stat.*), *On the relationships between the Indian black tea plant and the climatic elements, Pt. 2.* *Journal of Agricultural Meteorology*, Tokyo, 8(1/2):17-19, March 1953. 2 figs., 5 tables. In Japanese. **DWB**—Low temperatures, rapid temperature changes, and the duration of abnormally low temperatures play an important role in the crop yield of Indian black tea. *Subject Headings: 1. Climatic effects on tea yield 2. Tea cultivation.—H. Arakawa.*

10N-459

551.586:551.524.36:633.7

Ijuin, H. (*Makurazaki Weather Station*), *On the relations between the growth of Assam black tea plants and the climatic elements, Pt. 3.* *Journal of Agricultural Meteorology*, Tokyo, 14(1):22-28, July 1958. 4 figs., 10 tables. In Japanese; English summary p. 26. **DWB**—In my first report, I asserted that the lowest temperature for the growth of Assam black tea plant which is easily affected by cold weather was -6.0°C and in my second report, I asserted that it was -8.0°C. But, by taking the temperature in Chiran Town where the parts on the ground of the above mentioned plant were said to die every year, I found that the lowest temperature on the grass there between Jan. 1 and Mar. 31, 1954, was -6.4°C. Now my conclusions are as follows: (1) In Makurazaki City the plant can grow at about -8.0°C. In Chiran Town its parts on the ground die even at -6.4°C. (2) Too many days at the temperature below zero is bad for its growth (in those 6 yrs, the yearly mean number of the days in Makurazaki City was 5, while in Chiran Town 19). In other words the total time at the lower temperature (below zero) and the frequent occurrence of the low temperature have a great influence on its growth. *Subject Headings: 1. Climatic effects on tea 2. Tea cultivation 3. Japan.—Author's summary.*

10N-460

532.71:633.72:581.45:551.586:551.524.3

Murata, S. (*Met. Res. Inst., Kyoto Univ.*), *The osmotic pressure of tea-leaves and the meteorological conditions of their environments late in the frost season.* *Journal of Agricultural Meteorology*, Tokyo, 14(1):1-5, July, 1958. 3 figs., 3 tables, 9 refs. In Japanese; English summary p. 5. **DWB**—The osmotic pressure of leaves is an indication of the cold hardness of a plant, according to the generally accepted theory that very severe frost injury of a plant results from decrease of sugar contained in the plant. Therefore, there is a weakening of the cold hardness of the plants caused by temporary warmth of the environment occasionally occurring late in the frost season. The measurement of osmotic pressure of tea leaves was carried out simultaneously with the meteorological observations in a tea garden of Uji City, Kyoto Pref. from Mar.-May 1957. The osmotic pressure of tea leaves which were nipped in the early morning (6 a.m.) every seventh day was measured by the cryoscopic method, and the air temperature was observed by a thermograph set near the plant. Comparison of variation of the osmotic pressure with that of mean air temperature of the two days preceding the nipping of tea leaves gives the following: (1) The osmotic pressure decreases with increasing air temperature in the case of the old leaves of the previous autumn; (2) Similar tendency may be found for the young leaves of the current spring, but not always so. Results show that the osmotic pressure of the young leaves is about 3/5 of that of the old leaves. This significant diurnal variation of the osmotic pressure of the leaves is seen in the results of 24-hr observations carried out on May 13-14, 1957. In these observations the leaf temperature in the crown of the plant and the crown surface and the air temperature near the crown surface were also simultaneously measured by thermojunctions. *Subject Headings: 1. Meteorological effects on tea leaves 2. Tea leaves 3. Osmotic pressure of tea leaves 4. Uji City, Kyoto Prefecture, Japan.—Author's summary.*

TOBACCO

10N-461

551.586:633.7

Fuang, Kuang Ying, *Climate and tobacco.* *Meteorological Bulletin*, Taipei, Formosa, 5(2/3):15-19, 1959. In Chinese; English summary p. 15. **DLC**—The tobacco plant can be cultivated under a wide range of climate and soil conditions but from the standpoint of quality of product, it is remarkably sensitive to its environment. This article describes the qualities of various kinds of tobacco

f. It shows how these qualities are affected by climate and weather, and tells what is done to set certain undesirable conditions. The distribution of tobacco throughout the world is discussed. An example illustrates the conditions under which some of the finest tobaccos are raised. Some general discussions of the growth of the new species in Taiwan Island are also mentioned. *Subject Headings: 1. Plant bioclimatology 2. Tobacco cultivation.—Author's abstract.*

TREES

10N-462

551.524:581.19:634.9

Aichele, Heinz (*Konstanz*), *Kambialtemperaturen am Baumstamm im Jahreablauf*. [Cambial temperatures of a tree trunk in the course of the year.] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen*, 1951/1952. p. 39-44. graphs. DWB—Diurnal variation of cambial temperatures at different sides and heights of a tree trunk is shown for selected clear days on the basis of observations extended over nine months. *Subject Heading: 1. Cambial temperatures.—A. Assur.*

10N-463

551.586 551.521.11:581.14:582.475

Fraser, J. W. (*Petawawa Forest Exp. Sta., Chalk River, Ont.*), *The effect of sunlight on the germination and early growth of jack pine and red pine*. *Canada. Dept. of Northern Affairs and National Resources. Forest Research Div., Technical Note No. 71*, 1959. 6 p. 4 figs., table, 2 refs. A—The factors that influence the growth of jack and red pine are shading, watering and seeding, as well as sunshine. The last is a major factor. The paper illustrates the techniques used at the Petawawa Forest Experiment Station (1952) in order to control the effect of sunlight on germination. The results of the five treatments made indicate that each species required different conditions and exposure rate for its maximum growth. *Subject Headings: 1. Plant bioclimatology 2. Solar radiation effects on plants 3. Germination 4. Pine forests 5. Petawawa Forest Experiment Station, Canada.—N.N.*

10N-464

551.586:634.1:581.45:551.571

Iizuka, I. (*Fac. of Educ., Ehime Univ.*), *The relation of the water content of loquat trees to various weather in early Spring*. *Journal of Agricultural Meteorology*, Tokyo, 14(4):121-123, March 1959. 6 figs., 2 refs. In Japanese; English summary p. 123. DWB—Since it is said that evergreen fruit trees, the water absorption of which is very much reduced at low temperatures, often suffer more from the dryness of winter wind than from the cold, the water content of the Tanaka loquat tree was investigated in the cold season. The water content of the leaves was measured with the impedance bridge which had special measuring terminal plates, and that of the trunk was measured with a hundredth millimeter dial gage and indicated in terms of radius fluctuation. The results of the investigation were summarized below: (1) The daily water content of the leaves reached the minimum at 4 p.m. and the maximum at 2 a.m., the range of fluctuation being 2.5%. That of the trunk showed much the same change. (2) In the daytime, the water content of the leaves of the outer crown was greater than that of the inner crown and reached the minimum at noon. The water content of the leaves of the inner crown reached the minimum 6 hrs later, and so did that of the trunk 2 hrs later than that of the leaves of the outer crown. A similar type of fluctuation was observed in the water content of those three. (3) The water content of the leaves was greatest on rainy days and smallest on windy days, the difference being about 4% at most. The water content of the leaves on a fine day was about 1% greater than on a windy day. It may be said that the loquat leaves have so many hairs that they can keep transpiration down a little. It may be for this reason that the water in the leaves did not show great changes in amount. It is suggested, therefore, that the loquat trees do not suffer very much from dry winter wind in warm regions. *Subject Headings: 1. Loquat trees 2. Water content of evergreen fruit trees 3. Evergreen fruit trees.—Author's summary.*

10N-465

551.586:634.9:581.14.056

Pardé, J., *Retour sur l'indice C.V.P. de Paterson*. [Reflections on Paterson's C.V.P. index.] *Revue Forestière Française*, Nancy, No. 1:50-53, Jan. 1959. chart, 2 refs.—C.V.P. index links up the main climatic factors of a given region with the yearly growth of trees within this region. Comments are made relating to PATERSON'S formula and modifications for the purpose of its application in France. Values of Paterson's index for more than 300 climatological stations have been reported on a chart and have made it possible to classify the various French regions with respect to the yield capacity of their forests. *Subject Headings: 1. Forest ecology 2. Forest climate-yield capacity relationships 3. Paterson's formula.—A.V.*

10N-466

551.524.37:551.509.612(52)

Sakamoto, T., *Protection of "Mogi-biwa," a species of Japanese medlars, from cold damage*. *Japan. Meteorological Agency, Tokyo, Memoirs of Industrial Meteorology*, 20(1):51-59, Oct. 1956.

17 figs., 4 tables. In Japanese; English summary p. 58. **DLC**—The Mogi-biwa is one of the special products of Nagasaki Prefecture. There are some places in the vicinity of the town of Mogi where the medlars suffer from cold in the period of young fruit, Feb.-March, and considerable reduction of the yield is often caused. The author has investigated the micrometeorology of the places and gathered some fundamental data for countermeasures against cold damage. The following method of investigation was used: 1) On receiving the low temperature forecasts from the Nagasaki Marine Meteorological Observatory, preparatory measures against cold damage were taken at the suspected places, and when the limits of the cold damage were reached, oil heaters were lighted; 2) On Feb. 2 and 21, 1955, the oil heaters were distributed; 3) On April 1 and 4, the extent of the damage was investigated. Conclusions: 1) At the affected places, the minimum temperature is lower by 1.5-2.0°C than at the Nagasaki Marine Meteorological Observatory. 2) The period of young fruit is Feb.-March. The limiting temperature of the cold damage is -3.0°C and the number of cases where the temperature is below -3.0°C is two or three in a yr on the average. 3) The causes of low temperatures are in most cases the continental high in Feb. and the moving high in March. 4) The micrometeorology and the microclimatology of the affected places have been brought to light. 5) The effect of oil heating is estimated to be a temperature rise of 2.0-3.5°C. *Subject Headings*: 1. Frost protection of fruit 2. Frost frequencies 3. Medlar trees 4. Mogi, Japan.—*Author's abstract*.

10N-467

551.506.8:633.64.(55)

Takasuna, M., *Phenological considerations on the colouration of maple trees*. *Japan. Centre Meteorological Observatory, Tokyo, Memoirs of Industrial Meteorology*, 15(1):67-70, May 1955. 3 tables, diagram, 3 refs. English summary p. 70.—It is suggested that phenological observation be made for a constant species, because the degree of coloration differs according to species. The time of shedding of leaves is more suitable than coloration as an indicator of the climate. *Subject Headings*: 1. Maple tree phenology 2. Japan.—*A. Assur*.

VEGETABLES

Vegetables (General)

10N-468

551.586:631.95 551.508.2

Ferguson, J. H. A. (*Inst. of Horticultural Plant Breeding, Wageningen*), *Photothermographs, a tool for climate studies in relation to the ecology of vegetable varieties*. *Euphytica*, Wageningen, 6(2):97-105, July 1957. 5 figs., table, 17 refs. English and Dutch summaries p. 104-105. **DLC**, **CU**, **PU**—If water is supplied artificially, vegetables can be grown in various countries where rainfall is insufficient. Therefore precipitation need not necessarily be a primary climatic factor in relation to ecological studies in vegetable varieties. Most important climatic factors are day length and temperature, which control the growth and life cycle of many important species. A photothermograph has been designed to express a climate, or the weather conditions during a certain period, as far as the last two factors are concerned. Similarly the dependence of the growth and life cycle of a plant on the photothermic factors may be expressed. This has been worked out for a not too complicated problem: the transition from the vegetative to the generative stage, and vice versa, of some varieties of red table beets and sugar beets. For a few varieties the borderlines were found between the photothermic conditions which have a vernalizing effect, and those which result in devernization. A comparison of these borderlines with the climate photothermographs of some places gives rise to various considerations. It has been shown that this method, if worked out further, may probably contribute to predicting the productivity of a variety in a certain region. *Subject Headings*: 1. Vegetable ecology 2. Daylight duration effects on vegetables 3. Temperature effects on vegetables 4. Photothermographs.—*Author's abstract*.

Beans

10N-469

551.524.31:581.14:633.

Mes, Margaretha G., *The influence of night temperature and day length on the growth, nodulation, nitrogen assimilation and flowering of stizolobium deeringianum* (velvet bean). *South African Journal of Science*, Johannesburg, 55(2):35-39, Feb. 1959. table, 5 refs., **DWB**, **DLC**—*Stizolobium deeringianum* plants were grown in nitrogen-free growth media at different night temperatures and day lengths. An increase in the night temperature generally increased the dry weight, the nitrogen percentage and therefore the total nitrogen content of the plants. The higher night temperature increased the number of nodules but reduced the average dry weight of the individual nodules. These smaller nodules appeared to be more efficient and assimilated more nitrogen per mg dry weight of nodule than large nodules at a lower night temperature. The depressing effect of a low

light temperature on growth was reduced by the addition of nitrogen to the growth medium. The growth of the plants at a low night temperature therefore appeared to be due to nitrogen starvation as a result of the decreased activity of the rhizobia rather than to a direct effect of temperature on the growth of the plants. Under the conditions of the experiment, variations in day length from 12 to 16 hrs had no significant effect on flowering or on nodulation and nitrogen assimilation. A night temperature of 21°C stimulated flowering when compared with lower or higher night temperatures. *Subject Headings:* 1. Nocturnal temperature effects on velvet beans 2. Nocturnal temperature effects on plant growth 3. Nitrogen assimilation by plants 4. Beans.—*Author's abstract.*

10N-470

551.586:551.506.8:635.65

Post, J. J. and Groenewegen, J. H., *Feno-klimatologisch onderzoek aan stamslabonen*. [Phenological investigations concerning the dwarf French bean (*Phaseolus vulgaris*) [Pt. 1].] *Netherlands Directie van den Landbouw, Mededelingen* [van de] *Directeur van de Tuinbouw*, 21(12):854-860, Dec. 1958. Pt. 2. *Ibid.*, 21(8/9) Aug./Sept. 1958; Pt. 3. *Ibid.*, 21(11), Nov. 1958. 11 figs., 9 tables. English summary of Pt. 3, p. 860. **DLC**—For purposes of planning in agriculture, phenological observations of dwarf French beans were carried out in 1949, 1950 and 1951 on several experimental plots in the Netherlands. Special attention was paid to the development of the plants in an early stage (in this case when 10% of the plants had developed the first or third compound leaf). The lack of agreement of the results with climatic data (especially temperature) is discussed. The southwestern part of the Netherlands (Zeeland) and the "Westland" (the glasshouse district between The Hague and Rotterdam) offer the best possibilities for early planting. However, the difference between these districts and other parts of the country was only about 3 days. In an early stage of development (i.e. when 10% of the plants had developed the first compound leaf), the southeastern part of the Netherlands (Venlo) was 3-4 days earlier than the Westland and the northern parts of the country. Weather conditions in the first weeks after planting seemed to be influential in inducing differences between the various districts. *Subject Headings:* 1. Dwarf French bean phenology 2. Netherlands.—*Authors' abstract.*

10N-471

551.577.37:633.3

Vámosi, Jenő, *Új módszer a termés lepusztulásának kiküszöbölésére, az elrugas veszélyének csökkentésére*. [New method for preventing the destruction of fruit and reducing the danger of abscission.] *Időjárás*, Budapest, 60(1):36-44, Jan./Feb. 1956. 6 tables, 2 refs. Russian and German summaries p. 36. **DLC**—The effect of excessive rainfall during fruit formation on abscission was investigated with several varieties of beans. Abscission is reported strongest when high rate of plant growth coincides with fruit formation. Varieties of beans for which this is the case should not be planted in poorly percolating soils. *Subject Headings:* 1. Excessive rainfall effects on beans 2. Beans.—*G.T.*

Lettuce

10N-472

551.586:535:635.52:581.14

Evenari, M. and Stein, G. (*Hebrew Univ., Jerusalem*), *The influence of light upon germination*. *Experientia*, Basel, 9(3):94-95, March 15, 1953. refs., 4 eqs. **DLC**—The effect of light on germinating lettuce seeds is discussed in relation to varying temperature and the admission of oxygen or carbon dioxide. It is believed that a process, similar to that of the trapping of electrons in a physical system, takes place in the biological system. *Subject Headings:* 1. Light effects on germination of lettuce 2. Lettuce.—*G.T.*

Peas

10N-473

551.524.35:551.506.8

*Katz, Yale H., *Relationship between heat unit accumulation and the planting and harvesting of canning peas*. *Agronomy Journal*, Geneva, N. Y., 44(2):74-78, Feb. 1952. 4 tables, 2 figs. refs. Abstracted from reprint. **DA**—Amounts of total heat required for maturity of Alaska and weevil peas are tabulated for 1942, 1943 and 1944. The study includes graphs of heat unit accumulation (Madison, Wis., April-July) for the three yrs under investigation and for the normal year, as obtained both by a direct summation and an exponential method. *Subject Headings:* 1. Accumulated temperatures 2. Pea phenology 3. Madison, Wis.—*G.T.*

10N-474

551.586:635.656:631.531

Riepma, P. Wzn., *De reactie van erwten op de zaaitijd*. [The response of peas to time of sowing.] *Vageningen. Instituut voor Biologisch en Scheikundig Onderzoek van Landbouwgewassen, Jaarboek* 1957:123-130, 1958. 3 figs., 10 tables, 10 refs. Dutch and English summaries p. 129-130. (*Me-*

dedelingen, No. 21.) **DLC** (SB183.W2A25)—In a sowing date trial with five pea varieties in spring the three long-day varieties started flowering much later than the two varieties which are not affected by day length (Gloire de Quimper and Kelvedon Wonder). Sown in Aug., however, they had a considerable longer vegetative period than the other two, although the average day length in the first three weeks after emergence was the same in late summer as in spring. This phenomenon may be explained by the fact that daylight reaction depends on temperature. A length of day which is optimal in spring may be suboptimal in summer. All five varieties tillered less when sown later than the number of pods, the number of seeds per pod and the thousand kernel weight were all lower. *Subject Headings:* 1. Peas 2. Daylight duration effects on peas 3. Temperature effects on peas.—*Author's abstract.*

10N-475

551.506.8:635.65

†Wang, Jen Yu and Bryson, Reid A., **A study of phytometeorological effects on the growth and development of peas.** Madison, Univ. of Wisconsin, Dept. of Meteorology, July 1956. 165 p., 2 figs., 67 charts, 9 tables, eqs. **DWB**—The various meteorological factors which might affect the maturing and yield of peas (of several varieties) are tested statistically with respect to growing conditions in Wisconsin and at Rosendale, Wis., in particular. Temperature summation, while far from a perfect index of length of time for maturing of peas, is the best indicator of those tested and provides the best tool for forecasting or for study. Precipitation is important only in the upper and lower quantities (drought or flood) in most cases. Length of day is important at temperatures of 50°F but not at 60°F. Soil temperature degree days are best indicator for sprouting. Sunshine isn't so important. Radiation intensity, though, is the best index of all the sunshine-radiation parameters. Relative humidity and dew were also tested and found to be of little significance. Combinations of parameters were also tested. The monograph is very thorough in treatment of all aspects of the problem: the history of the pea, review of research on the various branches of plant ecology, crop data for world and U. S., meteorological data for Ethiopia (the original home of the pea) and for Wisconsin, extensive crop phase and yield data, etc. Dozens of tables or graphs and a detailed subject index are included. Various approaches to the problem of phytometeorology of the pea are critically evaluated and a good selective bibliography is presented. *Subject Headings:* 1. Pea phytometeorology 2. Pea phenology 3. Wisconsin.—*M.R.*

Potatoes

10N-476

551.586:633.49

*Abe, Izo and Takahashi, S. (both, *Tohoku Agricultural Experiment Station*), **Agroclimatic studies on the direction of rows in the potato fields (preliminary report).** *Journal of Agricultural Meteorology*, Tokyo, 11(4):127-129, March 1956. 2 figs., 6 tables. In Japanese. **DWB**—The different direction of rows in the potato fields could affect both the development and harvest. An experimental area was made up of rows in N-S, E-W, NE-SW, and NW-SE directions; seeding took place on April 28, fertilizing on June 11, with density of rows 2.5 ft-1.2 ft. Earth temperature at -5, -10, -20 cm of earth surface in each ridge zone was figured, and air temperature was discussed in connection with the frequency of maximum wind in June, July and Aug. in 1952. To figure the difference of harvest and development of potatoes, the length, weight and thickness of stalk of each zone were compared and tabulated together with data in regard to roots. Number of bifurcated boughs, of potatoes on plant, starch value and weight of potatoes are given. A synoptic summary has been made as follows: 1. Earth temperature in the E-W zone was low; 2. Air temperature between the ridge zone E-W was higher than NE-SW; 3. Thickness of stalk (5%) was the highest in E-W and weight of potato was superior to that in other zones. *Subject Headings:* 1. Agroclimatic techniques 2. Potato row direction-crop yield relationships 3. Potato cultivation.—*K.C.*

10N-477

551.586:633.49

*Escribano Isava, Fernando (*Ingeniero Agrónomo*), **Ensayos sobre variedades de patata realizados durante el período 1949-1956.** [Experiments on varieties of potatoes made during 1949-1956.] *Spain. Instituto Nacional de Investigaciones Agronómicas, Anales*, 7(2):333-530, 1958. 3 tables eqs. **DLC**—Meteorological data for each year are given for May-Oct. 1949-1956 (minimum maximum, and mean temperature, highest and lowest temperature, and relative humidity) for the potato experiment station Granja Modelo in the province of Vitoria. Results of experiments are tabulated and related to weather conditions. *Subject Headings:* 1. Climatic effects on potatoes 2. Potatoes 3. Vitoria, Spain.—*M.R.*

10N-478

551.577:631.83:633.49

Franc de Ferrière, P. J. J. (*Soc. Commerciale des Potasses d'Alsace, Mulhouse*); Camez, Th. and Millot, G. (both, *Lab. of Geology, Strasbourg*), **Influence des types d'argile des sols et de la pluviosité sur la nutrition potassique de la pomme de terre.** [The effect of clay type and rainfall on the potas

[um nutrition of the potato.] *Paris. Institut National de la Recherche Agronomique. Annales, Ser. A, Annales Agronomiques*, 9(1):51-70, Jan./Feb. 1958. 9 figs. French, English, German and Russian summaries p. 69-70. **DLC**—Correlations are discussed between the mineralogical structure of clays in soils of nine potassium-fertilizing experimental fields and the yield of potatoes receiving different rates of potassium fertilizer, in relation to rainfall conditions in various years. The investigations were carried on with soils: 1) partially montmorillonitic; 2) containing predominantly siliceous clay; 3) containing predominantly chloritic clay, and 4) containing predominantly kaolinitic pseudo-clay. Results indicated that the potassium requirement of a potato crop on a given soil depended not only on the physiological potassium needs of the plant but on the K^+ -ion requirement of the clays as well, varying with the mineralogical character of the clay and increasing with increasing cation-exchange capacity. Enrichment of the soil with organic matter (organic residues or green manure) which increases the K^+ fixing capacity of the soil and rain help to increase yields. *Subject Headings*: 1. Rainfall effects on fertilizer efficiency 2. Potato yield 3. Potassium nutrition of potatoes.—*Authors' abstract*.

10N-479

551.586:633.491:632.952

†Guntz, M.; Hascoet, M.; Ventura, E. and Arnoux, J., *Influence de quelques produits antiphytogramiques sur le rendement de la pomme de terre: Action fongicide et action physiologique*. [Influence of some antiphytogramic products upon the yield of potatoes: fungicide action and physiological action.] *Paris. Institut National de la Recherche Agronomique, Annales, Ser. C, Annales des Epiphyties*, 9(4):517-550, Oct./Dec. 1958. 6 figs., 19 tables, bibliog. p. 548-550. **CU**—Mildew has spread in France and constitutes a serious threat to potato culture in this country. Authors investigate efficacy of fungicide treatments. They compare the yield of parcels treated with cupric organic fungicides, with the yield of unprotected parcels free from mildew. Description of trials made 1954-1956 and interpretation of the results are given. Examination of fungicide action, physiological action and survey of the influence of climatic conditions are also included. The authors examine in particular, the influence of the number of rain days, mean amplitude of temperature, precipitation and humidity. It seems that the phenomenon should be in connection with the frequency of rains rather than with their intensity, or otherwise with the relative humidity. One notes a certain parallelism between the changes in frequency of rains and mean amplitude of temperature and the evolution of the disease. A distinct relationship does not appear between the total amount of precipitation and the phytotoxicity. On the other hand, phenomenon of toxicity will be the more marked when the climate is more humid. *Subject Headings*: 1. Potato cultivation 2. Mildew diseases of potatoes 3. Fungicide effects on mildew 4. Climatic effects on mildew diseases.—*A.V.*

10N-480

551.506.8:633.491

*Popovskaia, O. M., *K metodike otsenki uslovii proizvodstaniia kartofelia v tsentral'nykh oblastakh Evropeiskoi territorii SSSR*. [Method of evaluating growth conditions for potatoes in central European USSR.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy*, No. 53:43-57, 1957. 11 figs., 13 tables, 8 refs. **DLC**—On the basis of some 14 yrs of observations on the growth of potatoes under various agrometeorological conditions in the central oblasts of European U.S.S.R., the author attempts to establish a method for evaluating both qualitatively and quantitatively the agrometeorological conditions for the growth of potatoes in this region. The growth dynamics of the potato are divided into three decadal periods, namely: seed formation to initiation of flowering; flowering to mass withering of leaves; and rapid decline of growth because of withered leaves. The agrometeorological conditions corresponding to the various phases of growth of potato tubers are presented in tables and graphs giving data on the growth of potato tubers in the first and second decades, of the formation for varying air temperature and soil moisture content, growth of potato tubers under different meteorological conditions during the second decade in percentage, growth during optimum weather conditions, mean growth of potato tubers with moisture supplies not less than 70% of field capacity, etc. The results of this study indicate the following: when the mean diurnal temperature during the period of sprouting to beginning of tuber formation is within 12-19°C, an increase in temperature accelerates tuber formation; the mean decadal temperature at a depth of 10 cm during the period of start of mass flowering to withering, is close to the mean decadal air temperature. The growth of leaves depends upon air temperature and the soil moisture content in the 0-20 cm layer. The growth of potato tubers for a 10-day period has been found to depend on the air temperature and soil moisture in the 0-50 cm layer. *Subject Headings*: 1. Potato phenology 2. European U.S.S.R.—*I.L.D.*

10N-481

551.521.16:6321.83:633.491

Schulze, E., *Zusammenwirken von Tageslänge und Höhe der Stickstoffgabe bei Kulturkartoffeln*. [Correlation between length of day and the amount of nitrogen with the growth of potatoes.] *Zeitschrift für Acker- und Pflanzenbau*, Berlin, 105(3):258-270, March 1958. 10 figs. (including

photos), 5 tables, 4 refs. **DLC**—During the 1955 growing season, in two series of pot experiment investigations were made into the correlation between length of day and the amount of nitrogen released from commercial fertilizers, and the growth and development of potatoes (Bona and Erstling varieties). The longer the duration of daylight, and the greater the associated nitrogen release, the longer were the tuber carrying stolons, and the more numerous and lengthy were the non-tuber bearing foliage stems, and the later and smaller was the tuber formation. With a 12-h day, and increasing quantities of nitrogen, assimilation was used primarily for tuber formation whereas with longer light duration, it was mainly used for leaf formation. Mature plants under longer day showed a greater resistance to *Phytophthora* and *Alternaria*. Plants growing up during long day showed greater curl and leaf roll symptoms; in short-day plants, such symptoms decrease as more nitrogen was given. At the final harvest, the lowest nitrogen application always gave the lowest tuber yield. **Subject Headings:** 1. Nitrogen effects on potatoes 2. Daylight duration effects on potatoes 3. Potato cultivation.—A.V.

10N-482

551.584.42:633.45

Tsuberbiller, E. A. and Vlasova, V. A., **K metodike agrometeorologicheskogo obosnovaniia agrotekhniki vozdel'vaniia kartofelia v Podmoskov'e**. [Method of establishing agrometeorological principles for the cultivation of potatoes in the Moscow region.] Moscow. *Tsentral'nyi Institut Prognozov, Trudy*, No. 53:20-42, 1957. 8 figs., 10 tables, 19 refs. **DLC**—In order to establish the microclimatic conditions in potato fields associated with the growth of potato leaves and tubers to establish the agrometeorological effectiveness of different field techniques and to determine the optimum agrometeorological conditions for tuber growth, the author made systematic studies of atmospheric temperature and humidity, soil temperature, evaporation, heat flow and heat exchange in the soil, total radiation and radiation balance and made simultaneous measurements at 5-day intervals of the growth of leaves and tubers. This study was carried out during 1952-54 in sandy soil near Kezenovo and in 1953-54 in alluvial clay soil of the Moscow River flood land. Extensive experimental data in the form of tables and graphs are presented on the relationship of tuber growth in both sandy and clay soils to mean 5-day daily and 1 p.m. air temperature, mean 1 p.m. relative humidity and moisture deficit, etc.; the relationship of tuber growth to total evaporation; evaporimetric coefficients (rates of actual evaporation to evaporation from a given surface taken as standard); amounts of total evaporation from a potato field observed during varying supplies of soil moisture and grass cover; daily variation of total evaporation from a potato field; mean total evaporation during different developmental phases of the potato during dry and humid periods; relationship between heat and radiation balance, etc. Stable large crop of potato tubers (4-5 gms/ha in 10 days) can be obtained in sandy soils only under the following conditions: supplies of productive moisture must not fall below 20-25 mm in the tilled layer of the soil, 50 mm in the half meter layer and 70 mm in the meter layer; the mean daily soil temperature at a depth of 10 cm should be in the range of 14-19°C; the moisture deficit of the atmosphere at 1 p.m. should not be greater than 8 mm (12 mb) and not less than 4 mm (6 mb); the air temperature at 1 p.m. should be within the range of 14-18°C at the corresponding relative humidity, 55-75%. Under the climatic conditions prevailing near Moscow such optimum conditions can be established during dry weather by limited (20-25 mm) but frequent irrigation and by establishing a daily evaporimetric coefficient. **Subject Headings:** 1. Potato field microclimatology 2. Evaporation coefficients 3. Moscow, U.S.S.R.—I.L.D.

10N-483

551.586:551.521.18:633.49

†Winkler, Erich, **Die Stoffproduktion der Kartoffelpflanzen im Tal (600 m), im Mittelgebirge (900 m) und an der Waldgrenze (1800 m) bei Innsbruck: Verwendung des Ultrarot-Absorptionschreibers zur landwirtschaftlichen Ertragmessung und Bilanzberechnung**. [The production of plant substance of potato plants in the valley (600 m), in the foot-hills (900 m), and at the timber line (1800 m) near Innsbruck: application of the infrared absorption recorder in the measurement of agricultural yield and in the calculation of assimilation rates.] Innsbruck. [Museum], *Veröffentlichungen*, Vol. 39, 1959. 65 p. 15 figs., 4 plates, 7 tables, 49 refs. **DLC**—A description is given of the instrumentation, including an infrared absorption recorder, which has been developed by the Department of Botany, University of Innsbruck, and which allows the recording of assimilation and respiration data from cut-off parts of plants. Great intensities of light may be produced during the laboratory tests with a high pressure xenon lamp at various temperatures. The optimum in assimilation rates of mature potato leaves shows a shift toward higher temperatures with increasing intensities of light (e.g. 17 to 20°C with 50,000 Lux). Potatoes grown on Patscherkofel (1880 m) show nearly the same amounts of CO₂ assimilated, as plants from the valley. Under the influence of the high elevation climate they display, however, a marked increase in the size of leaves, which are reduced again to normal, when cultivation is continued in the valley. Owing to climatic conditions near Innsbruck, potatoes may be grown near the timber line from June-Sept., with a yield of 740 gm per plant on the average. Through the use of special fertilizers (boracic acid) the re-

activity of the plants against subfreezing temperatures could be increased from -1.9°C to about 3°C . A summary of climatological data from Patscherkofel for the years 1941 through 1958 is included in the appendix. Neatly drawn diagrams show the correlation between weather and plant growth. *Subject Headings:* 1. Infrared absorption recorders 2. Potatoes 3. Weather—plant growth relationships 4. Altitudinal effects on potato plant growth 5. Agroclimatological data in Austria.—E.R.R.

10N-484

551.586:633.491

Zillmann, Karl-Heinz, *Betrachtungen zu den Spätkartoffelerträgen der Jahre 1956 und 1957*. [Considerations on the late potato crop of the years 1956 and 1957.] *Angewandte Meteorologie*, Berlin, 3(7):205-211, June 1959. 3 figs., table, 12 refs. German summary p. 205. **DLC**—After a general discussion of the weather conditions associated with high yields of late potatoes the author analyzes in great detail the reasons why the late potato yield of 1956, which was on heavy soil, was considerably below that of 1957, which lay upon light soils. The causal factors are the precipitation and the temperature variation before blossoming. While the weather of 1956 was good for the potatoes in light soil, it led to considerable excess moisture which influenced them during the summer. The growth of the tubers suffered from the moisture and a deficiency of air. In some localities which were colloiddally rich, the drought period in May was weakly marked. The weather of 1957 was almost ideal for potatoes in many localities. However, as a result of the continuing drought period in June and July, germination damage and delay in the beginning of growth of the tubers occurred in the light soils. Injurious factors are the following: a rather long extension of the extreme drought period; a too high rise in soil temperature and repeated late nitrogen mobilization in July. *Subject Headings:* 1. Weather-crop relationships 2. Potato yield.—I.L.D.

Radishes

10N-485

551.524.36:635.15

El Murabaa, A. I. M., *Effect of high temperature on incompatibility in radish*. *Euphytica*, Wageningen, 6(3):268-270, Oct. 1957. 3 photos, 2 tables, 6 refs. English and Dutch summaries. **DA, CU, PU**—Clones of radish plants were cross pollinated or selfed at 17°C and 26°C . In cross-compatible plants the seed set; the average number of seeds per pod and the total seed yield was decreased at 26°C . In incompatible plants the seed set, and the total seed yield was increased when selfing was done at the higher temperature. It is concluded that while high temperature has an unfavorable effect on seed set of radish plants, it also weakens the incompatibility reaction between pollen and style, so that the result is a small increase in yield. *Subject Headings:* 1. Radish culture 2. Temperature effects on seed setting.—*Author's abstract*.

Tomatoes

10N-486

551.586:635.64

551.573:581.11

Abd el Rahman, A. A. and Bierhuizen, J. F. (*Laboratory of Plant Physiological Research, Agricultural University, Wageningen, Netherlands*), *The effect of temperature and water supply on growth, transpiration and water requirement of tomato under controlled conditions*. *Wageningen. Landbouwhoogeschool, Mededelingen*, 59(3), 1959. 13 p. 2 plates, 6 figs., 2 tables, 7 refs. **DLC**—Tomato plants were grown at different constant air temperatures (26° , 20° , 15° and 10°C) and four different irrigation treatments (A, B, C, D) for each temperature. Average moisture content was A: 90%; B: 80%; C: 65%; and D: 52.5% of field capacity. The rate of evapotranspiration, transpiration and soil evaporation was determined by means of weighing. Various growth aspects were measured and from the data obtained on transpiration and gain in dry weight, the water requirement was calculated. The experimental results are shown in tables and graphs. The average vapor pressure deficit during the entire growth period was 17.8, 10.6, 6.4 and 2.6 mm Hg at 26° , 20° , 15° and 10°C respectively. The evaporation rate, measured by Piche evaporimeter was 8.4, 5.2, 3.2 and 2.2 mm/day. Transpiration rate decreases with decrease in temperature and VPD; this decrease is less pronounced at lower irrigation levels. It varies between 2.69 and 0.14 mm/day. At the maximum water supply, the soil evaporation rate decreases from 1.64 mm/day at 26°C to 0.41 mm/day at 10°C . At the maximum temperature, a reduction from 1.64 to 1.12 mm/day was found from A to D. Fresh weight of the shoot is linear with air temperature, whereas the slope varies with the water supply. At optimum water supply, the gain in dry weight of shoot is reduced to about 19% in the temperature range from 26° to 10°C . This gain is reduced to about 53% in irrigation level from A to D. The water requirement, expressed as grams of water transpired per g dry matter produced, varies between 247 and 256. It decreases with decrease in air temperature and water supply. *Subject Headings:* 1. Tomato culture 2. Weather effects on tomato growth 3. Evapotranspiration from tomatoes.—A.V.

10N-487

551.586:635.64 551.524:551.573:581.1

Abd el Rahman, A. A.; Bierhuizen, J. F. and Kuiper, P. J. C., (*Laboratory of Plant Physiology Research, Agricultural University, Wageningen, Netherlands*), **Growth and transpiration of tomato in relation to night temperature under controlled conditions.** *Wageningen. Landbouwhoogeschool Mededelingen*, 59(4), 1959. 6 p. + plate, 6 figs., table, 6 refs. **DLC**—Study on the effects of night temperature on growth, transpiration and water requirements of tomatoes. Tomato plants were grown during a period of 28 days, at a constant day temperature of 25.3°. During the night period (12 hrs), they were kept at four different temperatures (25.3°, 20.0°, 15.6° and 9.2°C respectively). The growth rate of the stem is lower at lower night temperatures. A decrease in night temperature from 25.3° to 9.2°C resulted in a reduction to 63% in the height of the shoot. The total leaf area does not show a regular variation, but the weight of 1 cm² leaf shows a regular decrease to 85% in the series with a night temperature of 9.2°C. The reduction in both the height of shoot and the dry weight of leaves results in a reduction to 73% in total dry matter of the shoot. The various effects of night temperature may, at least partly, be ascribed to the time lag of soil temperature occurring after lower night temperatures. The transpiration rate per unit area during the whole 24 hr decreases significantly only with a night temperature of 9.2°C, namely to 76%, which was due to decrease in day transpiration. The night transpiration was approximately one fifth of that during the day, and decreased to 56, 52, and 50% with a decrease in night temperature from 25.3°, 20.0°, 15.6° and 9.2°C respectively. The decrease in night transpiration may be due to a decrease in the vapor pressure deficit at the lower temperatures. The water requirement does not show a regular variation in relation to night temperature, which may be attributed to similar percentual changes in transpiration and dry matter production. *Subject Headings*: 1. Tomato culture 2. Night temperature effects on tomato growth 3. Transpiration rates of tomatoes.—*Authors' abstract.*

10N-488

551.586:551.521.16:635.64

*Bouillenne-Wabrand, M. (*Institut de Botanique, Université de Liège*), **De l'action de la lumière sur la croissance et le développement des tomates. Comparaison entre la lumière artificielle et la lumière naturelle dans les conditions climatiques fixées du phytotron.** [The effect of light on the growth and development of tomato plants. Comparison between artificial and natural light in the climatic conditions of the phytotron.] *Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique, Brussels, Classe des Sciences, Bulletin*, Ser. 5, 44(3):267-278, March 1958. 4 figs., 4 tables. **DLC**—The tomato plants (Joffre variety) have been cultivated since their sowing in phytotron (temperature 20°C, humidity 80%) with natural light for the months Jan., Feb., March, May, July, Nov. The results achieved after 48 days are compared with those obtained in a dark room, under artificial light with adjustable intensity and a 16-hr photoperiod. Plants cultivated under ±4500 Lux are comparable with those sown in March under 7200 and 7800 Lux; the results approximate the yields under natural light for the months May-July. Under 2700 Lux, the plants show a deficiency and do not flower, as in the case of sowings made in Jan., Feb. and Nov. *Subject Headings*: 1. Agricultural bioclimatology 2. Light effects on tomatoes 3. Phytotron 4. Tomato culture 5. University of Liège, Belgium.—A.V.

10N-489

551.524.37:635.64(439.1)

Korbonits, András, **Időjárási tényezők hatása a paradicsomtermes mennyiségére és az érési idejére.** [Effect of weather upon the quantity of the tomato crop and the time of ripening.] *Időjárás*, Budapest, 61(6):436-444, 1957. 7 figs., 6 tables. German summary p. 436. **DLC**—In 1954 extensive experiments were made in various parts of Hungary in order to determine the effect of various cultivation practices upon the amount and quality of tomato crops. Results of the study are presented and the conclusion is reached that the planting should take place earlier than the customary date and the risk of possible killing by spring frost should be taken. *Subject Headings*: 1. Spring frosts 2. Frost damage to tomatoes 3. Tomato culture 4. Hungary.—G.T.

10N-490

551.586:635.64

Van Die, J., **Diurnal rhythm in the amino-acid content of xylem exudate from tomato plants bleeding under constant environmental conditions.** *Akademie van Wetenschappen, Amsterdam. Afdeling voor de Wis- en Natuurkundige Wetenschappen, Proceedings*, Ser. C, 62(1):50-58, 1959. 7 figs., 30 refs. **CU, DLC, NN**—Bleeding experiments were carried out with three month old tomato plants cultivated on nutrient salt solutions. Under strictly constant conditions of temperature, light and composition of the nutrient solution around the roots, the amino acid concentration of a sequence of xylem exudate fractions showed a very pronounced daily rhythm, with a maximum between 11 a.m. and 1 p.m. and a minimum during the night. The bleeding sap fractions were collected over 60-hr periods. The qualitative composition of the amino acid fraction of the exudate did not detectably alter during the night. Day-night rhythm glutamine was the main component, followed in decreasing order by valine, leucineisoleucine, α-alanine and glutamic acid and asparagine. *Subject Headings*: 1. Tomato culture 2. Climatic effects on tomatoes.—*Author's abstract.*

Vineyards

10N-491

551.524.371:632.111.5:634.8

Eisel, Hans, *Untersuchungen über die Frostschutzberechnung*. [Researches into frost protection through water sprinkling.] *Weinberg und Keller*, Frankfurt a. Main, 5(3):120-127, March 1958. figs., ref. DA—The author gives the results obtained during a night when vines needed protection against a frost of -5°C . Damage was noted on plants when density of water sprinkling was below mm/hr. Rotating sprinklers were set in equilateral triangle formation of 21 m side and spaced at 24 m distance. The quantity of artificial rainfall obtained by sprinkling was about 2 mm/hr and the rotation time of sprinklers was not more than 2 min. *Subject Headings*: 1. Viticulture 2. Frost protection of vineyards 3. Sprinkling irrigation.—A.V.

10N-492

551.524.37:634.8:631.521.6:632.11.53

Fallot, J., *Résistance aux basses températures hivernales de quelques hybrides de vignes greffés*. [Resistance to low winter temperatures of some grafted hybrid vines.] *Toulouse. Ecole Nationale Supérieure Agronomique, Annales*, 5(1):29-44, 1957. 2 figs., 4 tables, 20 refs.—Study of the resistance to low temperatures of some hybrid vines situated in an experimental vineyard located in a given milieu where hard frost has appeared under given conditions. Except in certain cases, the damage may practically be evaluated with regard to the number of buds which formed a sprout the year following the frost. The different hybrid varieties have been unequally sensitive to low winter temperature action. One stock only has obviously improved the resistance of the greater part of its hybrid grafts to the cold. *Subject Headings*: 1. Hard frost 2. Frost damage to vineyards 3. Cold resistance of vineyards 4. Vineyards.—A.V.

10N-493

551.586:634.83

Huglin, P. (*Station de Recherches Viticoles et Oenologiques, Colmar*), *Recherches sur les bourgeons de la vigne: initiation florale et développement végétatif*. [Investigations of the fertility and the vegetative development of buds of grapevines.] *Paris. Institut National de la Recherche Agronomique, Annales, Ser. B, Annales de l'Amélioration des Plantes*, 8(2):113-272, April/June 1958. 74 figs., 79 tables, bibliog. p. 269-272. French, English, Russian and German summaries p. 265-269. DA—In this study, undertaken at the Viticultural Research Station of Colmar from 1952-1957, two phases of the development of grapevines have been analyzed: the fertility of latent buds and the vegetative development of the different types of buds of this plant. From the climatological viewpoint, the author examines the fluctuation of fertility from the point of view of precipitation and thermal sums during the formation period of the primary inflorescence. The climatic conditions of this period influence distinctly the fluctuation of fertility of buds. The author calculates the correlation coefficient, relating fertility to the sums of precipitation and temperature. The preponderant influence of the water factor or the heat factor depends essentially on the local conditions. However, according to the environment considered, the part played by one factor may be overcome by the preponderant influence of the other factor. Closely related to the conditions of winter cold, the period of the end of dormancy is essentially a genetic property of species and variety. *Subject Headings*: 1. Viticulture 2. Vineyard phenology 3. Climatic effects on vineyards 4. France.—A.V.

10N-494

551.509.329:634.8

Kibardin, R. E., *Kolichestvennyi pokazatel' dlia prognoza srokov tsveteniia vinograda*. [A quantitative index for forecasting the period of grape flowering.] *Meteorologiya i Gidrologiya*, Leningrad, 10:36-37, Oct. 1958. table. DWB, DLC—The rate of development of grapes depends largely upon the sum of effective temperature computed from 5°C ; these vary less in years with different types of spring and are more constant than sums computed from 10 and 0°C . Since in the southern part of the U.S.S.R. mean daily atmospheric temperatures of 5°C and higher may occur in January or February and it is not always easy to establish the date on which 5°C is reached, sums of effective temperature above 5° must be used for the period from beginning of the calendar date to start of flowering. On the basis of an analysis of observations for the period 1935-1941 the sum of effective temperature of 655°C was established for the period above 5° to start of flowering. In different regions of the U.S.S.R. the same varieties usually flower when the same temperature sum has accumulated. A latitude difference of $7-8^{\circ}$ does not have any effect. Other varieties of grapes may require sums of $700-900^{\circ}$ for flowering. This constant may be employed to forecast the date of flowering; the method of long range forecasting of flowering of grapes is illustrated. *Subject Headings*: 1. Grape flowering forecasting 2. Temperature effects on grape flowering 3. Grapes 4. U.S.S.R.—I.L.D.

10N-495

551.524.37:634.8:631.541.1

Ollram, F., *Über die Holzreife und Frosthärte von Schnittreben*. [On wood maturity and frost resistance of rootstocks.] *Klosterneuburg, Austria. Höhere Bundeslehr- und Versuchsanstalt für*

Wein-, Obst- und Gartenbau, Mitteilungen, Ser. A, Rebe und Wein, 8(1):30-34, 1958. 7 refs. German, English, French and Spanish summaries p. 34. **DA**—Frost resistance of vines is of particular importance for viticulture in northern areas. It is dependent on stored starch reserves. From investigations the author concludes that there is, however, no relation to wood maturity; he emphasizes the fact that starch, too, is undergoing a specific decomposition during the vegetation pause which results in the loss of frost resistance. *Subject Headings*: 1. Frost resistance of vineyards 2. Frost damage to vineyards 3. Viticulture 4. Austria.—A.V.

10N-496

551.584.31:631.4:634.8

Penkov, M. D., *Napравlenie vinogradarstva v Severnoi Bolgarii v zavisimosti ot pochvennykh i klimaticheskikh uslovii*. [Vine culture in North Bulgaria with reference to soil and climatic conditions.] *Pochvovedenie*, Moscow, No. 3:67-72, March 1959. 8 tables, 7 refs. English summary, p. 72. **DLC**—In order to encourage the development of viticulture and improve the quality of wine produced in Northern Bulgaria, the author discusses soil and climatic conditions and the slope exposure of vineyards necessary to obtain the best results in the growing of various types of grapes. Sweet wines, champagne, table wines and transportable table grapes can be produced in this region if proper climatic, soil and slope exposure conditions are taken into consideration in the planting and cultivation of the grapes. *Subject Headings*: 1. Vineyard microclimatology 2. North Bulgaria —A.M.P.

10N-497

551.524.371:632.111:634.8

Peyer, E., *Frostschutz der Reben*. [Protection of vineyards against frost.] *Schweizerische Zeitschrift für Obst- und Weinbau*, Wädenswil, 67(26):660-662, Dec. 27, 1958.—Because of frost the years 1953, 1956 and 1957 have been very unfavorable for vineyards in Switzerland. In vineyard regions of eastern Switzerland, vines are protected against frost by covering the plants with straw shields. The author gives a rough estimate of the costs for Switzerland. For more important vineyards, oil heating has been used. The author supposes that "central heating" is most used; sprinkling of vines poses the problem of water reserves in the Swiss regions. *Subject Headings*: 1. Frost protection of vineyards 2. Vineyards 3. Switzerland.—A.V.

10N-498

551.509.612:551.524.371:631.417

Primault, B., *Kann roher Müllkompost als Frostschutzmittel dienen?* [Can raw compost serve as a means of protection against frost?] *Schweizerische Zeitschrift für Obst- und Weinbau*, Wädenswil, 68(21):486-491, 1959. 3 figs., 2 tables, 2 refs. **DA**—One-half of a vineyard situated on the grounds of the Swiss Meteorological Institute was covered with raw compost (thickness of the layer: 4 cm). Thermometers were placed 40, 20 and 5 cm above the compost and the bare soil, as well as on the surface and at depths of 2 cm and 5 cm in the compost, and in the bare soil. The recordings of temperature cover a period of 43 days and nights. These measurements show that compost has practically no influence on the air temperature (the effect is even slightly negative during the night, owing to radiation), while a heating of the covered soil is noted. *Subject Headings*: 1. Frost protection of vineyards 2. Compost cover influence on temperature near the ground 3. Vineyards 4. Switzerland.—A.V.

10N-499

551.586:634.8

Ribière-Gayon, Gilles, *Influence des facteurs physiques sur la maturation du raisin*. [Effects of physical factors on ripening of grapes.] *Académie d'Agriculture de France, Paris, Comptes Rendus*, 45(12):588-592, June 17, 1959. 6 refs.—An experimental study is presented on the influence of climatic factors on the ripening of grapes. Varying soil moisture, sunshine duration and temperatures are considered. The quality of ripening is measured by determining the acidity of the berries. Too much or too little soil moisture gives poor ripening. Sunshine decrease causes an increase in acidity and an important decrease of the sugar content. Temperature increase leads to an increase of the sugar content and reduction of acidity. *Subject Headings*: 1. Viticulture 2. Climatic effects on grapes.—A.V.

10N-500

551.524.37:632.111.52:634.8

Schmitt, Norbert, *Regionale Verbreitung der Spätfrostschäden vom Mai 1957 in Rheinland-Pfalz*. [Regional distribution of late frost in May 1957 in Rhineland-Pfalz.] *Gesunde Pflanzen*, Frankfurt am Main, 11(6):120-122, June 1959. **DA**—The late advection frost in May 1957 was catastrophic in the vineyard regions of Rhineland-Pfalz. The article gives a brief discussion of the 88 maps (in 7 colors) presenting the different degrees of frost damage, meteorological conditions, damage distribution and frost protection in the Rhineland-Pfalz vineyard area. These charts were made by the Agrometeorological Service of the German Meteorological Institute. *Subject Headings*: 1. Late spring frosts 2. Frost damage to vineyards 3. Vineyards 4. Rhineland, Germany.—A.V.

10N-501

551.524.371:632.111:634.8(43)

Thiel, A., **Erfahrungen mit der Frostbekämpfung im Weinbau durch Geländebeheizung.** [Experiments in the protection of vineyards against frost by heating.] *Weinberg und Keller*, Frankfurt A.M., 5(3):107-120, March 1958.—After giving practical examples, the author discusses frost protection practices during the past 30 yrs in the vineyards of Falkenstein and Oberemmel/Saar. The STEINHEUER system for determination of dangerous frost situations permits establishment of the danger, determination of the threatened zones, and time to regulate the heating intensity. Heating against frost is efficacious in direct proportion to the area of the surface to be protected. The fact that danger of destruction by late frost persists in many of the European wine growing regions, indicates that protection of vineyards must be organized in a rational manner. The author advises the use only of apparatus examined by the Biologische Bundesanstalt in collaboration with the research center at Trier. *Subject Headings: 1. Frost protection of vineyards 2. Vineyards.—A.V.*

10N-502

551.584.42

Suboi, Yasoji and Honda, Isao (*Natl. Inst. of Agric. Sci.*), **Micro-meteorological characteristics in the vineyard. Pt. 2.** *Journal of Agricultural Meteorology*, Tokyo, 10(1/2):37-41, Dec. 1954. 4 figs., 6 tables, refs. In Japanese, English summary p. 41. **DWB**—This paper compares the vineyard micrometeorology with the luxuriance of the trellis of grapes and studies the difference when soybeans were planted in the field under the trellis. This investigation was carried out for several days in both summer and autumn, i.e., July 14-15, Aug. 20-21, and Nov. 5-6, 1953, in a vineyard in Tokyo Agricultural Experiment Station. It was recognized that there were two layers of thermal importance, i.e., the soil surface and the trellis of grapes. The vertical distribution of temperature and the relative humidity distribution are presented with data on the luxuriance of the trellis of grapes. The micrometeorology in the vineyard was not affected even when the soybean was planted under the trellis, because the trellis has a great influence upon the microclimatology of the vineyard. *Subject Headings: 1. Vineyard microclimatology 2. Tokyo, Japan.—Authors' abstract.*

10N-503

551.584.3:634.8

Weger, Nikolaus, **Zur Methodik der Kleinklimakartierung im Weinbau.** [Technique of microclimatic mapping in viticulture.] *Germany. Deutscher Wetterdienst, Mitteilungen*, 2(14):132-133, 1955. **DWB**—The value of microclimatic mapping in viticulture is discussed. The climatic elements important in wine growing discussed by the author are distribution of minimum temperatures, soil temperature, global radiation and wind velocity. The observational procedure and instrumentation are outlined. *Subject Headings: 1. Microclimatic mapping 2. Vineyards.—I.L.D.*

10N-504

551.584.4:634.8

Weise, Rudolf, **Rückgang des Weinbaues gefährdet das Mikroklima.** [Influence of viticulture diminution on microclimate.] *Weinberg und Keller*, Frankfurt am Main, 6(6):447-450, 1959. ref.—Our forefathers were not favored by weather conditions, though the old chronicles mention many regions where the vine was cultivated, although no trace of this cultivation can be found at the present time. By means of very clear examples, the definitions of weather, climate and microclimate are given and the reasons which altered the microclimate are especially emphasized. A second part of the article deals with microclimate in relation to landscape; vineyards are very good suppliers of cold air influencing the other local crops. Experiments have also proved that isolated vineyards have to be more protected against late frost than grouped ones. Displacement of the different agricultural crops influence unfavorably the microclimate of a place as regards vineyard cultivation; the author gives some examples. A long range project is to be set up for the different crops. Instead of bringing arbitrary changes, it will be possible to suppress the bad variations of microclimate, detrimental to vineyards. *Subject Headings: 1. Microclimates 2. Microclimatic analysis 3. Vegetation influences on microclimates 4. Vineyard microclimatology.—A.V.*

WHEAT, GRAINS AND WINTER CROPS

Wheat

10N-505

551.586:633.11

*Contreras Arias, Alfonso, **El trigo en México, Pt. 2, El clima.** [Wheat in Mexico, Pt. 2, The climate.] México, D. F., Banco Nacional de Crédito Agrícola, S. A., 1941. 257 p. figs., charts (in color, fold.), tables. **DWB** (M86:633.1 C764t)—A major monograph on the regions of the world and particularly of Mexico, favorable for growing or extending the growth of wheat (mainly winter wheat) and on the climatic conditions in general and of specific regions in Mexico of importance for wheat growing (following Azzi and his degree-day and limits of growing season and growth area concepts). Beautiful color charts of Mexico and the world illustrate the wheat growing

regions. The temperature, precipitation and evapotranspiration (using THORNTHWAITHE's system) are thoroughly discussed and illustrated by means of selected data for various regions or specific points in Mexico. *Subject Headings:* 1. Wheat climates 2. Mexico.—M.R.

10N-506

551.586:551.521.16:633.11:632.111

Dantuma, G. (*Foundation for Agricultural Plant Breeding, Wageningen, Netherlands*), **Breeding wheat and barley for winterhardiness.** *Euphytica*, Wageningen, 7(2):189-195, July 1958. fig. 3 photos, 5 refs. English and Dutch summaries. **DA, CU, PU**—In 1951 the Foundation for Agricultural Plant Breeding, Wageningen, had a refrigerator and hardening equipment installed with the aim of providing private breeders with cold resistant material and of testing their young lines for this characteristic. This gave the author an opportunity of studying problems of wheat and barley, such as winter hardiness, cold resistance, influence of vernalization and day length, the inheritance of the winter and spring types and of winter hardiness, etc. Sowing time trials in autumn with additional seed vernalization and lengthening of the day appeared to be valuable contributions to the research of cold resistance. The data gathered are treated in a thesis of which this article gives a summary. *Subject Headings:* 1. Wheat 2. Barley 3. Photoperiodism 4. Climatic effects on wheat 5. Climatic effects on barley.—A.V. and author's abstract.

10N-507

551.577.2/3:633.11

Dightman, R. S. (*State Climatologist, Weather Bureau, Helena, Mont.*), **Precipitation and production of wheat in Montana.** *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 43(20):7-8, May 14, 1956. **DWB, DLC**—A graph shows the average precipitation during the year and during the growing season at representative stations in wheat areas of Montana. Lewistown has the highest annual average precipitation of 16.79 in. *Subject Headings:* 1. Wheat production 2. Precipitation data 3. Montana.—N.N.

10N-508

551.586:551.506.8:633.111

*Evseev, P. K. and Sapozhnikova, S. A., **Opyt klimaticheskoi kharakteristiki mezhfaznykh periodov razvitiia iarovoi pshenitsy.** [Attempt at a climatic characterization of interphase periods in the development of spring wheat.] *Leningrad. Nauchno-Issledovatel'skii Institut Aeroklimatologii, Trudy*, No. 4:5-29, 1958. fig., 12+8 tables, 2 refs. **DLC**—The authors present the results of meteorological observations during the different phases of the development of a moderately maturing variety of spring wheat. The observations were made at the following stations: Moscow, Tomsk, Tatarska and Barnaul. The boundaries of phase development were determined by the criterion of effective temperature obtained by A. A. SHIGOLEV. The meteorological data were worked up for the following interphase periods: sowing-germination (total effective temperature, $\Sigma = 40^{\circ}\text{--}107^{\circ}\text{C}$); germination-shoot formation ($\Sigma = +07^{\circ}\text{--}267^{\circ}\text{C}$); shoot formation-spike formation ($\Sigma = 267^{\circ}\text{--}597^{\circ}\text{C}$); spike formation-waxy ripeness ($\Sigma = 597^{\circ}\text{--}1087^{\circ}\text{C}$). Data were obtained on the beginning and end of the interphase periods, number of days with precipitation and total precipitation for individual years and for normals for interphase periods; frequencies of different amounts of moisture deficit and air temperature for different interphase periods including harvesting; frequencies for different wind velocities and air temperature during spike formation-waxy ripeness and harvesting; and frequency of frosts during period of waxy ripeness. All these data are presented in tables in an appendix. An analysis of the data shows that points situated on practically the same latitude differ in their vegetative periods; the total of 1087°C , accumulated during different time intervals, was necessary for the development and maturing of spring wheat. The predominating number of cases with longest periods corresponds to the largest amount of precipitation. The percentage of warm weather during the periods of shoot formation-spike formation was uniform in all the stations examined but not during the period spike formation-waxy ripeness. The wind velocity during spike formation-waxy ripeness had little significance as a factor influencing the period of spike formation-waxy ripeness in Tatarska. The characteristics of the period of wheat harvesting and of hay harvesting are discussed. *Subject Headings:* 1. Spring wheat phenology 2. U.S.S.R.—I.L.D.

10N-509

631.41 551.577:633.11

Franc de Ferrière, P. J. J.; Camez Thérèse and Millot, Georges, **Influences des types d'argile des sols et de la pluviosité sur la nutrition potassique du blé.** [The effect of clay type and rainfall on the potassium fertilization of wheat.] *Paris. Institut National de la Recherche Agronomique, Annales, Ser. A, Annales Agronomiques*, 9(2):149-166, March/April 1958. 10 figs. French, English, Russian and German summaries p. 163-166. **DLC**—The effect on wheat yields of different types of clay in relation to rainfall conditions during six months (Nov.-April) was investigated in eight potassium-fertilized experimental fields: 1) in the presence of predominantly micaceous and montmorillonitic clay; 2) in the presence of predominantly micaceous clay; 3) containing pre-

ominantly micaceous clay, but rich in chlorite and quartz; 4) containing predominantly chloritic clay; 5) rich in chlorite and quartzose pseudo-clay; and 6) containing predominantly quartzose pseudo-clay with slight amounts of mica and kaolinite. Results indicated that the depressing effect of increasing rainfall on wheat yields varies with the nature of the clay in the soil. The depressing effect is slight in the presence of montmorillonitic clay, more marked in the presence of predominantly micaceous clay, and progressively increases with increasing chlorite, kaolinite and quartz content of the clay. An increase in the nitrogen and humus levels of the soil partially counteracts the depressing effect. *Subject Headings: 1. Fertilizer effects on wheat yield 2. Rainfall effects on wheat yield 3. Wheat yield.—From authors' abstract.*

10N-510

551.524:633.11:581.14

Ganeva, B., *Vliianieto na temperaturniia faktor въркhu prodължитelnostta na niakoi fazi ot razvitiето na zimnata pshenitsa u nas.* [Influence of the temperature factor on the duration of certain phases of the development of winter wheat in Bulgaria.] *Khidrologiia i Meteorologiia*, Sofia, No. 3:59-61, 1958. 2 figs., 7 tables, 4 refs. Russian and English summaries p. 60-61. **DLC**—The article deals with the connection between ambient temperature and the development of winter wheat in Bulgaria. A formula is developed giving values for sowing, sprouting, ear formation and ripening. The use of these constants for the determination of duration of interphase periods gives good results only for years of normal temperature and precipitation conditions. *Subject Headings: 1. Temperature effects on wheat 2. Winter wheat cultivation 3. Bulgaria.—Based on author's abstract.*

10N-511

551.521:633.11

Gorlenko, M. V., *Primenenie solnechnoi energii dlia bor'by s pyl'noi golovnei pshenitsy.* [Application of solar energy against dusty darnel of wheat.] *Priroda*, Moscow, 44(11):115-116, Nov. 1955. **DLC**—A description of a method employed by Chinese peasants to combat dusty wheat darnel by exposing wheat seeds to the sun's rays during July and Aug. The seeds are raised to a temperature exceeding 50°C. Wheat grown from such seeds was found to be healthy. *Subject Headings: 1. Solar radiation effects on wheat seeds 2. Wheat diseases 3. Wheat cultivation.—I.L.D.*

10N-512

551.586:633.1

Hara, S. (Kanagawa Crop Report Office), *On experiment in the forms of seed-beds and ridge-farming.* *Journal of Agricultural Meteorology*, Tokyo, 6(3/4):135-139, Aug. 1951. 3 figs., 7 tables. In Japanese; English summary p. 139. **DWB**—Micrometeorological conditions prevailing in seed beds of various form and depth, with or without ridges, were investigated. Schematic diagrams of the seed beds are given. Data on underground and surface temperature are presented and their effect on the growth of wheat, especially in the early stages of development, discussed. *Subject Headings: 1. Seed bed microclimate 2. Temperature effects on wheat 3. Wheat 4. Japan.—G.T.*

10N-513

551.586:631.531.173

Hartman, Th. A., *Jarowisatie onderzoek in 1956.* [Jarowization research in 1956.] *Wageningen. Instituut voor Biologisch en Scheikundig Onderzoek van Landbouwgewassen, Jaarboek 1957: 17-121, 1958.* 3 figs., table. Dutch and English summaries p. 120-121. (*Mededelingen* No. 20.) **DLC** (SB183.W2A25)—Germinating seeds of Staring winter wheat and Petkus winter rye were kept at temperatures of approximately 0, 2.5 and 5°C during periods of 0, 6, 12, 18, 24 and 30 days. In wheat 0°C had practically no effect. Better results were obtained with 2.5°C but at 5°C the optimum had not yet been reached. The optimal vernalization period for wheat is probably not much above 30 days. In rye a treatment at 0°C hardly had any effect; it may be assumed that the optimum will not be much higher than 5°C, but a vernalization period of 30 days is still far from optimal. The seeds used were harvested from plants, used in experiments on heat and rain damage. It is shown that the weather conditions during the flowering of the mother plants have a certain influence on the sensitivity to vernalization of the seeds. *Subject Headings: 1. Vernalization 2. Wheat 3. Rye 4. Meteorological effects on vernalization.—A.V.*

10N-514

551.5:86:551.579.5:633.11

Kontorshchikov, A. S., *Agrometeorologicheskaiia otsenka usloviy formirovaniia urozhaiia sel'skokoziastvennykh kul'tur na primere iarovoï pshenitsy.* [Agrometeorological evaluation of conditions for farm crop development, shown by the example of spring wheat.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy*, No. 53:82-94, 1957. 2 figs., 6 tables, 12 refs., eqs. **DLC**—It is shown that the agrometeorological evaluation of productivity can be made with the aid of the following formulas:

$$R_m = \frac{E}{T_m} \approx \frac{Z-U}{T_m} \quad \text{and} \quad R_{\max} = \frac{E}{T_{\min}} \approx \frac{Z-U}{T_{\min}}$$

where R_m and R_{max} = mean and maximum yield of agricultural crops (100 lbs/hectare) for given level of agricultural technology; E = transpiration of the entire vegetation period (in mm); Z = total evaporation for the period (in mm); U = evaporation directly from the soil surface during the vegetation period (in mm); T = mean transpiration coefficient (in mm) referred to 100 lbs/hectare yield; T_m = minimum transpirational coefficient obtained experimentally (in mm) referred to 100 lbs/hectare yield. The determination of the mean and minimum values of the transpiration coefficients (T_m and T_{min}), computation of the evapotranspiration from spring wheat, and determination of the evaporation from the soil surface are discussed and the relevant formulas for computing these variables are presented. The actual agrometeorological evaluation of the conditions of yield production of spring wheat if soil moisture and meteorological data are available is illustrated by means of specific examples. *Subject Headings:* 1. Weather effects on wheat yield 2. Soil moisture effects on wheat yield 3. Wheat yield.—I.L.D.

10N-515

551.586:633.11(82)

Michajlikov, Vladimir; Juarez, Guillermo A. and Alvarez Herlien, Laureano A., *El temple del trigo contra la sequía aplicado al gran cultivo*. [Wheat hardening against drought applied on a large scale.] *Meteoros*, Buenos Aires, 4(3):215-229, July/Sept. 1954. 5 figs. (incl. photos), 11 tables. Spanish and English summaries p. 215. **DWB**—The application of a method of hardening wheat against drought plantings is described. Experiments were carried out on six different farms within a marginal zone. Weather conditions during the trials are described. The yields were 30%-66.5% greater for the hardened wheat in two of the trials and almost equal to the controls in the third trial, which was influenced adversely by a green bug attack. Statistical analysis of the yield, plant height, spike length and tillering is presented. *Subject Headings:* 1. Wheat cultivation 2. Drought resistant wheat.—Based on authors' abstract.

10N-516

551.586:551.524.37:633.11/16

Noda, K. and Tateiski, S., *On the frost injury of wheat and naked barley after heading in the Shimabara Peninsula, Nagasaki Prefecture*. *Journal of Agricultural Meteorology*, Tokyo, 11(3):1155-1158, Dec. 1955. fig. In Japanese. **DWB**—An investigation of the degree and extent of damage was made May 21-22, 1953. It was concluded that a frost soon after heading and a NE and NNE wind were major causes of the damage. *Subject Headings:* 1. Frost damage to wheat 2. Frost damage to barley 3. Wheat 4. Barley 5. Shimabara Peninsula, Nagasaki, Japan.—K.C.

10N-517

551.524.37:633.11

Okamoto, Y.; Kanzaki, Y.; Inoue, H. and Kotaka, S. (all, Kanto-tosan Office of Crop Damage Statistics, Ministry of Agriculture and Forestry), *On the frost damage of wheat plants occurred at Tokorozawa district, Saitama prefecture in 1955*. *Journal of Agricultural Meteorology*, Tokyo, 12(1):13-16, July 1956. 2 figs., 6 tables, 5 refs. In Japanese; English summary p. 16. **DWB**—In this paper, investigation of the frost damage of wheat plants which was found in Saitama Prefecture in April, 1955 is reported. The results of the investigation are as follows: (1) The death of young ears by freezing takes place in wheat of low degree winter type. Formation of ears on the newly developed tillers which usually are incapable of bearing, and the delaying of heading time were characteristic. (2) The death of young ears was caused by the low temperature (-2.4°C) on April 5. Ratio of dead (frozen) stems to all the stems was estimated on the field to be 68.3% in the severely damaged field, 48.1% in the intermediately damaged field, and 23.3% in the lightly damaged field. Such a difference in damage was considered very likely to be caused by the difference in the growth and developmental stage of the plants. (3) As the result of the damage, the growth of the damaged plants was changed. The change was easily recognized in the number of newly formed stems, the stem length, the stem diameter and the heading time, etc. High correlation was found between the degree of damage and the changing of the above mentioned morphological characteristics, as well as between each of these characteristics. (4) Effect of the damage of the yield of wheat was analyzed. The effect was easily recognized in the decrease in the number of complete grains, thus lowering the ratio of the complete grains to the whole, and also in the increase of the quantity of incomplete grains and in the decrease of 1000 grains weight, etc. Actual decrease in yield was not found in the slightly damaged field, but decrease of about 30% and 70% in yield was found in the intermediately affected and severely affected fields respectively. These differences in the yield may be accounted for by the fact that newly developed stems were capable of producing grains to compensate for the decrease and this compensation differs with the different fields. (5) Therefore it is apparently possible to estimate the decreased amount of yield of wheat caused by frost damage by the productivity of the newly developed stems. Significant correlations were found between the productivity and the number of days which the heading was delayed, length of stems, or diameter of stems, etc. *Subject Headings:* 1. Frost damage to wheat 2. Wheat yield 3. Tokorozawa District, Japan.—Authors' abstract.

10N-518

551.506.8:633.12

Orlov, V. M. and Zavalishin, V. A., *Iz opyta opredeleniia pokazatelei skorosti razvitiia i optimal'nykh srokov seva grechikki*. [Experiments in the determination of indicators of the speed of development of buckwheat and the optimum dates for sowing it.] *Meteorologiya i Gidrologiya*, Leningrad, No. 1:50, 1958. **DWB, DLC**—The best agrometeorological conditions are present for sowing during the period of June 5-15 when 300-450° of effective temperature have accumulated at the beginning of the period. For the Alexinsk Hydrometeorological Station (Tula Oblast) the best index for sowing buckwheat is the accumulation of 360° effective temperature ± 2 or 3 days, taking into account meteorological conditions during sowing. The mean value of the sums of effective temperatures for interphase periods for the development of the "Bogatyr" variety of buckwheat are given. *Subject Headings*: 1. Buckwheat phenology 2. Tula Region, U.S.S.R.—I.L.D.

10N-519

551.586:633.11(44)

Paquet, J., *Caractéristiques d'adaptation des blés destinés à la plaine de Limagne*. [Characteristics of adaptation of wheat varieties to the Limagne Plain.] *Paris, Institut National de la Recherche Agronomique, Annales, Ser. B, Annales de l'Amélioration des Plantes*, 9(3):421-434, July/Aug. 1959. French, English, German and Russian summaries. **CU, DA**—This study has been undertaken in order to bring to the wheat breeder, working in the Limagne region, a basis of work by giving a definition, in correlation with the climate, of physiological characteristics which are the most favorable to a high or regular yield. The distribution and intensity of rains during certain periods of the vegetation are regarded as preponderant climatic factors in regard to the wheat yield. The author shows that rainfall before flowering is one of the determining factors of the yield in Limagne. The sensitivity of wheat to rainfall deficit during the month preceding the earing, varies from one variety to another. Besides rainfall, the sum of the mean temperatures necessary for growth, and the influence of heat strokes at the end of June and beginning of July on the lime-washing, permit the selection of those varieties of wheat more suited to this region of France. *Subject Headings*: 1. Wheat cultivation 2. Rainfall effects on wheat yield 3. Temperature effects on wheat yield 4. Limagne Plain, France.—A.V.

10N-520

551.506.8:633.11

Pascale, Antonio Juan, *Método para determinar las características bioclimáticas de una variedad de trigo*. [Method of determining the bioclimatic characteristics of a variety of wheat.] *Meteoros*, Buenos Aires, 5(1/2):5-18, Jan./June 1955. 4 figs., table, 7 refs. Spanish and English summaries. **DWB, DLC**—The method involves the continuous sowing of the test variety of wheat, simultaneously with bioclimatically known varieties. Requirements in low temperatures and photoperiods are studied through the use of vernalized seeds, at different sowing periods. The bioclimatic interpretation is based on a comparison of parabolic curves obtained with GESLIN's heliothermic index. The application of this method to a new variety of wheat, President Perón, M.A.G. is discussed. *Subject Headings*: 1. Wheat phenology 2. Argentina.—Based on author's abstract.

10N-521

551.586:551.571:631.55:633.11

Protserov, A. V., *Agrometeorologicheskoe obsluzhivanie perioda uborki khlebov slozhnymi kombinami*. [Agrometeorological service during harvest with the use of harvesting combines.] (In: U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby, *Voprosy agrometeorologii*, ed. by F. F. Davitaia and M. S. Kulik. Moscow, 1958. p. 35-39. 3 tables, 3 refs.)—The use of harvester combines requires a knowledge of the onset of ripeness of wheat. The interval between waxy and complete ripeness depends upon the rate of maturing which is a process of moisture loss. A hyperbolic relationship has been established between the waxy-ripeness interval and moisture deficit. From the mean daily moisture deficit it is possible to determine the daily rate of desiccation of bread grains in percent of the entire process. From the mean long period dates of onset of waxy ripeness and atmospheric moisture deficit the duration of the interphase period of waxy-complete ripeness of winter and spring grains is determined. The probability of duration of the period of selective harvesting of spring wheat varies in different physical geographic regions. A hyperbolic relationship has been established between moisture of grain and straw and atmospheric moisture deficit, for ears $y = 30.4/x^{0.33}$, for straw $y = 65.1/x^{0.63}$ where y = moisture of grain and straw (in %), x = atmospheric moisture deficit (in %). The productivity of combines is shown to vary with the value of atmospheric moisture deficit. Agrometeorological indices characterizing the work of a harvesting combine can be established. From these indices and the daily variation of atmospheric moisture deficit it is possible to establish the total working time of the combine. The daily duration of working time of a combine characterizing each climatic zone is established and outlined. Data are presented on the probability of duration of the period of selective harvesting of spring wheat in different regions of the U.S.S.R., mean long period moisture content of rain in percent, probability of obtaining grain of a particular moisture content during combine harvesting 10 days after the onset

of complete ripeness, etc. *Subject Headings:* 1. Grain climatology 2. Spring wheat harvest 3. U.S.S.R.—I.L.D.

10N-522

551.524.372:633.11:632.111..

Robin, M., Les effets du froid de l'hiver 1955-56 sur quatre variétés de blé. [Effect of cold weather during the winter 1955-56 on four varieties of wheat.] *Toulouse. Ecole Nationale Supérieure Agronomique, Annales*, 50(1):17-28, 1957. 2 figs., 5 tables, 14 refs. **DA**—Four varieties of wheat, sown in autumn and winter for the purpose of ecological studies, were affected by the severe cold wave of Feb. 1956, which led to different observations concerning the damage caused. The resistance to cold weather, which is important at the beginning of the tillering, lessens rapidly from this tillering stage to germination. The more advanced the plant development, the more unfavorable are the conditions involved in cold weather. The degree of resistance diminishes as the physiological age increases. The main factors in the resistance to cold weather are the fundamental properties of the plant cell and of the protoplasm. The higher the perviousness and the elasticity the greater will be the resistance. *Subject Headings:* 1. Hard frost effects on wheat 2. Cold resistance of wheat 3. Wheat.—A.V.

10N-523

551.586:633.11(584.6)

Samokhvalov, N. F., Agroklimaticheskie uslovia vozdeleyvaniia iarovoi pshenitsy v raionakh osvoiniya tselinnnykh i zaleznykh zemel' Severnogo Kazakhstana. [Agroclimatic conditions for spring wheat cultivation in areas where virgin and fallow land is being reclaimed in Northern Kazakhstan.] *Alma-Ata, Kazakhstan. Nauchno-Issledovatel'skii Institut, Trudy*, 8:28-46, 1957. 3 figs., 3 tables, 12 refs. **DWB**—On the basis of phenological data of summer wheat and climatic data the author determined the mean and extreme dates of appearance of the various developmental stages of spring wheat and the moisture supplies in the soil, atmospheric moisture deficit, amount of precipitation and mean daily air temperature associated with the developmental stages. A detailed account is given of the agrometeorological conditions associated with the cultivation of spring wheat in various zones of northern Kazakhstan and the climatic conditions associated with the phases of sowing-emergence, emergence-stalk and leaf formation, stalk and leaf formation-spike formation, and spike formation-waxy ripeness. *Subject Headings:* 1. Wheat bioclimatology 2. Spring wheat cultivation 3. Northern Kazakhstan.—I.L.D.

10N-524

551.521.16:633.11

†Schmalz, H., Der Einfluss alternierender Kurztag- und Dauertag-Perioden verschiedenen Länge auf die generative Entwicklung einiger Sommerweizenformen. [Influence of alternating short- and long-day periods on the development of some spring wheat forms.] *Zeitschrift für Pflanzenzüchtung*, Berlin, 39(1):97-112, Feb. 1958. 4 figs. (including photos), 3 tables, 38 refs. **DA, DLC**—Spring wheat was observed during six weeks of growing and submitted to an alternating treatment of short- and long-day periods. The four varieties employed reacted in the same manner. *Subject Headings:* 1. Daylight duration effects on wheat 2. Spring wheat.—A.V.

10N-525

551.524.37:633.11:631.521.6:632.111

Schmalz, H., Die generative Entwicklung von Winterweizensorten mit unterschiedlicher Winterfestigkeit bei Frühjahrssaat nach Vernalisation mit Temperaturen unter- und oberhalb des Gefrierpunktes. [The development of winter wheat, with varying resistance against cold during spring sowing after vernalization under temperatures above and under 0°.] *Der Züchter*, Berlin, 28(5):193-203, Aug. 1958. 5 figs., 5 tables, 53 refs. **DA, DLC**—52 varieties of winter wheat were sown during spring in 1954-1957 after different vernalization treatments. The varieties are divided into 3 groups: 1) slightly resistant, 2) moderately resistant and 3) highly resistant. The vernalization time was: 36 days (1954), 40 days (1955), 63 days (1956), and 46 days (1957). The relationship between the delay of the vernalization period and the resistance against cold has been established. Research has shown some exceptions to this relationship. *Subject Headings:* 1. Frost resistant wheat 2. Wheat 3. Vernalization.—A.V.

10N-526

551.582(81) 551.586:633.11

Silva, Ady Raul da, Heidrich Sobrino, Edmundo and Lardy, André C., Ensaios comparativos de trigo em Pelotas, Canguçu and Piratini. [Comparative studies of wheat in Pelotas, Canguçu and Piratini.] *Agros*, Pelotas, 5(3):135-168, Sept. 1952. 2 figs., 32 tables, 6 refs.—Climatic conditions in Pelotas, Rio Grande do Sul are summarized on p. 138-9 and histograms for 1949, 1950, 1951 and normal (1893-1948) for each month and curves showing extreme monthly maximum and minimum temp. for each month of the 3 yrs and for the entire period (1893-1948) are given. The remainder of the report has to do with experiments on production of wheat of many varieties in 1949, 1950 and 1951. *Subject Headings:* 1. Climate of Pelotas (Rio Grande do Sul), Brazil 2. Climate and wheat 3. Wheat 4. Pelotas, Brazil.—M.R.

10N-527

551.578.7:633.11

Shimoyama, T. (*Faculty of Agric., Okayama Univ.*), **Analysis of the reduction of yield and the resumption of yield of wheat affected by severe hail-fall.** *Journal of Agricultural Meteorology*, Tokyo, 13(3):99-104, Feb. 1958. 2 figs., 12 tables, 14 refs., eqs. In Japanese; English summary 104. DWB—During May 23-25, 1955, there was a hailstorm (diameter of hailstones was 1-2 cm) throughout Okayama Prefecture. It lasted for about 10-20 min and caused tremendous damage to field crops everywhere; above all, great damage was caused to wheat crops in the southern district. As the wheat was ripe, this damage was not only accelerated by the physical injury (e.g. stem snapping, head cutting, grain dropping, etc.) but was also caused by physiological injury, the retardation of normal maturity of seeds since then. This investigation was made at Sho-Son, Tsukubo-Gun, the center of the hailstorm, in which seven plots at intervals of 500 m along both sides of the center line of the hailstorm course were selected to probe the actual damage caused by the hailstorm. Samples were taken from the same variety (local variety Norin No. 52) in the same growth stage. The degree of breakdown of stem and head, ratio of the sum of dropped grains to total on head and the positions from which the grains were removed were classified in stratiform in order to get the estimated yardstick of yield reduction derived from correlation between the number of stalks injured and wheat yield. The following conclusions are summarized from this study: 1) Hail injury rapidly increased, and was proportional to the distance from the center line of the hailstorm course. It is therefore concluded that hailstorm damage is highly localized. 2) The process of injury is as follows: First the grain drops, then the stem breaks or is cut, and head drops down. Finally all plants fall down. 3) It was observed that the frequency of stem break was highest at the first internode of the upper part of the stem and was significantly low at the third to fourth internode of the lower part of the stem. 4) The position of grain drop caused by the hail falling on the head did not agree with the sequence of flowering and ripening of the head, but was related to the angle at which the grain was exposed to the hailstorm. Heads which were snapped at the upper internode and suspended in the air tended to show more grain drop at the lower half of the head. 5) It was clear that wheat yield reduced by hailstorm injury depended largely on the dropping off of heads and grains. Moreover, it was likely that the injury of both stem and leaf caused by hail hindered subsequent full maturity of the kernel. A formula is given to estimate the yield of damaged wheat. *Subject Headings: 1. Hail damage to wheat 2. Wheat yield reduction 3. Hailstorms 4. Okayama Prefecture, Japan.—Author's summary.*

10N-528

633.11:632.1

*Sreenivasan, P. A. (*Met. Office, Poona*), **Crop growth as an indicator of the final yield-wheat crop.** *Indian Journal of Meteorology and Geophysics*, 9(2):161-166, April 1958. 4 tables, 6 refs. DWB, DLC—The Coordinated Crop-Weather Scheme of India records systematic observations of important crops, including wheat. Data on the wheat crop, collected at six crop-weather stations are used in this study. Tables present the magnitude of variation present in the various crop characters; correlation coefficients between the various crop characters as well as yield; and multiple regression formulas for predicting the final yield. The efficiency of the regression formulas to predict the yield is presented in a table. *Subject Headings: 1. Coordinated Crop-Weather Scheme 2. Wheat yield 3. India.—N.N.*

10N-529

551.586:551.577.32:633.11(46)

*Téllez Molina, Ricardo and Garcia Pozuelo, Eduardo, **Ensayos comparativos de rendimiento de los trigos de origen híbridos, 1955-1956.** [Comparative experiments on yield of wheat crop of hybrid origin.] *Spain. Instituto Nacional de Investigaciones Agronómicas, Anales*, 7(1):9-60, 1958. 4 tables, eqs. DLC—Crop and monthly rainfall data for 1954-5 and 1955-6 are given for Alcalá de Henares, 0°30'W, 40°30'N, 600 m elevation; for Badajoz at 3°20'W, 38°53'N, 186 m; Villatobas (Toledo), 0°20'E, 39°55'N, 750 m; Vitoria, 2°41'E, 38°40'N, 959 m; Aranda de Duero, 0°, 41°40'N, 98 m; Iznalloz, 0°15'E, 37°21'N, 1020 m; Valladolid, 1°2'W, 41°39'N, 693 m; and Zamora, 2°5'W, 1°30'N, 630 m. *Subject Headings: 1. Wheat yield 2. Rainfall data 3. Spain.—M.R.*

10N-530

551.586:631.531.173:633.11

Ulrich, R.; Ildis, P. and Paulin, A., **Quelques observations sur le développement des blés d'hiver.** [Some observations on the development of winter wheat.] *France. Centre National de Recherche Scientifique, Journal des Recherches*, No. 14:265-268, 1951. 4 figs., table, refs. DLC—Experiments conducted during the period 1946-1949 by applying Lysenko's vernalization method are reported (the method consists of seeding winter wheat seeds in spring, instead of fall, after exposure to +2°C temperature for a month at the beginning of germination). The experiments comprised comparative observation of the growth of vernalized crops and of those planted at the same date without previous treatment. The varieties used were Vilmorin 23 and 27, and Golden Drop. Results are presented, discussed, and illustrated. In addition to the already publicized conclusions

resulting from the application of Lysenko's method, some particular statements are made regarding the reactions of the French varieties, especially in connection with the poor development of seed planted in April. *Subject Headings: 1. Vernalization 2. Winter wheat cultivation.*—G.T.

10N-531

551.573:633.11

Venkataraman, S. (*Central Agricultural Met. Obs., Poona*), **Water requirements of irrigated wheat-variety kenphad.** *Current Science*, Bangalore, 25(6):79-80, June 1956. fig., table, ref. **DWB, DLC**—Studies of water losses by evapotranspiration, using experimental equipment similar to that used by THORNTWHAITE (*AGU Transactions*, 27, 1946), were made at Poona from Nov. 1954-March 1955 in a wheat plot. A galvanized iron tank 5'X5'X2½' with its rim 3" above the soil surface, connected to a supply reservoir so that a water table could be maintained 18" below surface, and arranged so that excessive water from rain and/or irrigation would overflow and be measured, was used. Curves show evapotranspiration curve paralleling growth curve (to some extent), except during brief periods when water was added from above (a sharp drop and recovery to a steady state in about 1 week). Total loss during season was about 15 in. *Subject Headings: 1. Evapotranspiration from wheat 2. Poona, India. 1. Thornthwaite, C. W.*—M.R.

10N-532

551.586:551.588.2:633.11

Watanabe, Y. (*Tochigi Agricul. Exper. Sta.*), **The late sowing culture of wheat on the southern inclined ridges.** *Journal of Agricultural Meteorology*, Tokyo, 15(2):55-58, Oct. 1959. 3 figs., 7 tables, 2 refs. In Japanese; English summary p. 58. **DWB**—To investigate the effects of southern inclined ridges upon the growth and the yield of late sown wheat, the experiments were carried out in 1955 and 1956: I. Relation between the angles of inclination and the width of the ridges. The angles were 10°, 20°, and 30°; and the widths were 61 cm, 91 cm and 121 cm. Therefore, the ridges were composed of these two factors. As to the plant height and the number of stems, the more the ridge inclined and became wider, the more vigorous grew the plants. On account of greater drying of soil with inclination of the slope, however, the yields were excellent on following ridges: 10° and 20° of 61 cm, 20° of 91 cm and 20° and 30° of 121 cm. II. The effects of the southern inclined ridges upon the late sown wheat. The comparison was made between the inclined ridge and the flat field in relation to late sowing culture in which the seeds were sown 10 or 20 days later than controls. The plant height, the number of stems and the yield of grains on the inclined ridges exceeded those on the flat field, because of higher soil temperature in winter on the inclined ridges. Therefore it seemed that the excellence of the inclined ridge was more effective in late sowing culture. *Subject Headings: 1. Wheat yield 2. Topographic effects on wheat yield.*—Author's summary.

Grains

10N-533

551.586:633.1:631.562:

Brooker, D. B. and McQuigg, J. D., **Analysis of weather data pertinent to grain drying.** Ithaca, N. Y., 1959. 6 p. 5 figs., table, 5 refs., 8 eqs. "For presentation at the 1959 annual meeting, American Society of Agricultural Engineers, Ithaca, N. Y., June 21-24, 1959." "Paper no. 59-307." **DWB**—A method has been presented by which weather data can be processed to yield information regarding two phenomena associated with grain drying. These are: a) the average Btu per pound of air that would be available for drying a grain mass of known moisture content; b) the average temperature of the portion of the grain mass that would be the last to dry if the air were forced through the mass. Samples of frequency distribution have been prepared from data obtained by the method of analysis. Distributions prepared from weather data for the month of Sept. for a 21-yr period at Columbia, Mo. are presented. *Subject Headings: 1. Weather data analysis 2. Grain drying 3. Columbia, Mo.*—Authors' summary.

10N-534

551.586:633.1

Kulik, M. S., **K otsenke agrometeorologicheskikh usloviï formirovaniia urozhaia zernovykh kul'tur.** [Evaluating the agrometeorological conditions of rain crop yield.] *Meleorologiya i Gidrologiya*, No. 21:11-14, Dec. 1959. 10 refs. **DWB, DLC**—During the past few decades the average yield of grain crops remained about the same. In order to improve the productivity of the land the agrometeorological conditions in various territories were statistically correlated with their productivity. Special attention is given to the degree of soil moisture, seasonal precipitation, thermal conditions, air humidity, wind, drought, arid wind, dust storm, snow or ice covers, depth of ground freezing, soil conditions, etc. The effects of various conditions on the growth of grain crops are discussed in detail. The evaluation of the agrometeorological and climatic conditions in various territories permits the use of improved techniques to produce larger yields. *Subject Headings: 1. Grain crops 2. Agrometeorological studies 3. U.S.S.R.*—N.P.S.

10N-535

551.586:551.521.16:633.11:632.111

†Pugnat, Claude and Stroun, Maurice, *Etude sur la résistance au froid des blés*. [Study of the cold resistance of cereals.] *Annuaire Agricole de la Suisse*, Bern, Nouv. Ser., 7(4):417-422, 1958. figs., 28 refs. **DLC**—The resistance to cold is an important factor in the overwintering of cereals. It is bound to the phenomena of photoperiodism. This relationship is made evident in two experiments where several varieties of wheat and barley have undergone various periods of illumination. These experiments have a practical application for a rapid determination of the resistance to cold of cereals. The authors worked out a sensitivity coefficient:

$$Q = \frac{\text{Duration of photoperiod in a short day (9½ hrs)}}{\text{Duration of photoperiod in a long day (15 hrs)}}$$

The higher the value of Q , the more the variety is sensitive to an illumination excess; conversely, every variety of which the quotient reaches or approximates 1 is completely insensitive. *Subject Headings*: 1. Cereals 2. Cold resistance of cereals 3. Photoperiodism 4. Climatic effects on cereals.—A.V.

10N-536

551.524.36:633.1:632.111

Stryckers, J., *L'influence d'un traitement au DNC sur la résistance au froid des variétés de céréales*. [Influence of a treatment with DNC on the resistance to cold of cereal varieties.] *Revue de l'Agriculture*, Brussels, 11(9):1323-1329, Sept. 1958. figs., 4 tables, 15 refs.—Experiments proved that a winter treatment with DNC could, under certain circumstances, stimulate the yield of winter cereals. After the hard frost of Feb. 1956 one noted, however, that even the most resistant varieties of winter barley, wheat and spelt had become more sensitive to cold after a treatment with DNC. Winter barley, particularly, suffered greatly, in the same way as the winter wheat varieties, being less resistant to cold. As concerns rye, resistance to cold diminished only in the regional varieties. *Subject Headings*: 1. Cold resistance of cereals 2. DNC treatment 3. Cereals.—A.V.

10N-537

551.578.46:633.1

*Sukawa, Tsutomu and Takahashi, Kamekiti, *Meteorology and the crops of barley and wheat. Iwate Meteorological Equality Corresponding Association, The Review*, Nov. 1951, p. 8-11. 4 tables. In Japanese; English summary, p. 2. **DWB**—Data from Mizusawa Observatory for 45 yrs (1902-46) were used to investigate relation between meteorological conditions and grain (wheat and barley) crops. If snow cover lasts too long crops are reduced, especially if the cover lasts over 100 days, or if the cover begins early. Connection is shown in tables. *Subject Headings*: 1. Agrometeorological data 2. Snow cover effects on grain harvest 3. Grain crops 4. Mizusawa Observatory, Japan.—M.R.

10N-538

551.506.8:633.1

Ulanova, E. S., *Az őszi gabonafélék fenológiai fázisainak kiszámítása az őszi időszakban*. [Calculation of the phenological phases of winter grain during the fall season.] *Időjárás*, Budapest, 60(4):206-211, July/Aug. 1956. 6 figs., table, eqs. Transl. by Mrs. László Faragó. German summary p. 206. Russian original, *Opredelenie nastupleniia fenologicheskikh faz u ozimkh kul'tur v osenii period*, p. I-IV. **DLC**—With the help of index numbers based on temperature, precipitation and soil moisture data, the dates of various phases in the development of grain crops in fall can be calculated. Thus the best time for sowing and other farming operations can be determined from anticipated meteorological conditions. *Subject Headings*: 1. Agroclimatic data 2. Grain crop phenology.—Transl. of author's abstract.

10N-539

551.506.8:633.16:519.2

Arléry, R., *Application de la méthode des courbes de régression de R. A. Fisher à la recherche d'une relation entre les rendements agricoles et certains facteurs météorologiques*. [Application of Fisher's method of regression curves to the investigation of a relationship between agricultural production and certain meteorological factors.] *La Météorologie*, Paris, Ser. 4, No. 37:19-27, Jan./March 1955. 3 figs., 2 tables, 4 refs., eqs. French, English and Italian summaries p. 19. **DWB**—Short exposition of the statistical method introduced by FISHER more than 30 yrs ago for the determination of regression curves showing the relationship between yield and climatic factors. The method is applied to the study of the decrease of barley harvests at Maule as a function of daily sums of total radiation calculated by 10-day periods from March 1-Aug. 31, according to observations made at Saint-Maur Park during 1935-1954. *Subject Headings*: 1. Regression techniques 2. Barley phenology 3. Maule, France.—Author's abstract.

10N-540

551.586:551.521.1:581.14:633.16

Kamel, M. S., *Efficiency of solar energy conversion as related with growth in barley*. *Wageningen. Landbouwhoogeschool, Mededelingen*, 58(8), 1958, 19 p. 8 figs., 27 refs. **DLC**—The

efficiency of solar energy conversion and the growth of barley as affected by shading and density; at successive intervals, were studied under natural conditions during the growing seasons 1957 and 1958. It has been established that the efficiency of solar energy conversion under field conditions increased with time to a maximum (at midseason), then decreased to reach a minimum at the end of the season. It followed closely the time trend of growth in leaf area, fresh weight, etc. Thus its value is extremely dependent on the stage of growth. The highest efficiency values were attained at the middle stages of growth (for a period of about 4-6 weeks). A maximum of 13.6% of the photo-synthetic radiation for the full daylight intensity was obtained in the shading experiment, while in the density experiment a maximum of 13.7% for the dense planting was reached. *Subject Headings: 1. Barley culture 2. Shading effects on solar energy conversion 3. Plant density effects on solar energy conversion.*—*From author's summary.*

10N-541

551.577.37:633.160

Schober, Karl, *Grannenabwurf der Gerste*. [Bearding of barley.] *Wetter und Leben*, Vienna, 8(5/7):147-148, 1956. DWB—The cause of this bearding of winter and summer barley and as a consequence the excessive shedding of grains observed in lower Austria is the excessive rainfall during June, amounting to 100-120 mm. *Subject Headings: 1. Barley 2. Excessive rainfall effects on barley.*—*I.L.D.*

10N-542

551.584.43:633.160

Szász, Gábor, *Az őszi árpa állományéghajlata*. [Microclimate of winter barley.] *Debrecen, Hungary. Tudományegyetem, Acta Universitatis Debrecenensis*, 3(2):251-269, 1957. 12 figs., 103 tables, 4 refs. German summary p. 268-269. DLC. Also issued as reprint, *Debrecen, Hungary. Tudományegyetem. Meteorológiai Intézet, Közlemények*, No. 13, 1956. Review by T. Szilagyi in *Időjárás*, Budapest, 61(4):319-320, July/Aug. 1957.—Atmospheric temperature (at 10 cm above ground) and soil temperature data obtained at Debrecen (mostly 1951) are presented, showing diurnal variations for various phenological phases and soil types. In general the crop temperatures is higher in the daytime than that of surrounding bare ground. Sand was warmer than loam in comparison with barley and bare soil. Comparison is also made with other grain crop microclimates. *Subject Headings: 1. Barley microclimatology 2. Grain crop microclimatology 3. Hungary.*—*G.T.*

10N-543

551.525:631.4:551.586:633.160

Szász, Gábor, *Talajkülönbségek hatása az őszi árpa állományéghajlatára*. [Influence of soil differences on the climate of winter barley.] *Agrokémia és Talajtan*, [Hungary], 5(4):471-484, 1956. 7 figs., 3 refs. Russian and German summaries p. 482-484. DA—The temperature conditions of winter grain stands are characterized by the fact that from the start of spring to the end of blossoming their temperature is higher than that of plant free surfaces. In this study the author investigated the manner in which different soil types influence the climate of stands by their physical structure. Two soil types were studied: a sandy soil of poor heat conductivity and loose structure and a steppe soil (loess) of good heat conductivity and compact structure. The air space over the former bed has a higher temperature than that over the latter. The upper layers of the sandy soil warmed better by day and cooled at night more than the upper layers of the steppe soil. Above the sandy soil the air was drier than above the steppe soil. The microclimatic conditions of the stand were regulated by the soil structure. During the interval between stem and ear formation the stand on steppe soil was colder than the stand on sandy soil. On sandy soil the temperatures between the lower and upper level were large by day; on steppe soil they were smaller; and the lower levels warmed more intensely by day and cooled more slowly at night than the upper levels. During the ripening period, when the stands are sparser, in spite of equal penetration of sunlight the stands on sandy soil were warmer than those on steppe soil. Statistical investigations showed that the differences in the plant stands of the same type resulting from different soils showed significant differences in extreme air and soil temperatures, which caused significant differences in yield. The yield on steppe soils was greater than that on sandy soil. During the growth and ripening period both stands had the same climatic conditions. Hence during the entire spring period of vegetation the stands increased the extreme temperatures of the air space between the plants as compared with the air space over soil without plants. This effect is greater on sandy than on steppe soil. The presence of stands reduces the diurnal fluctuation of temperature. *Subject Heading: 1. Barley climates—soil relationships.*—*I.L.D.*

10N-544

633.13:581.17:551.579.5

Lapeyronie, André, *Inversion du gradient de capacité en eau dans le limbe foliaire de graminées*. [Reversal of water capacity gradient in the leaf limb of graminaceae.] *Académie des Sciences, Paris, Comptes Rendus*, 248(22):3205-3207, June 1, 1959. ref. DWB, DLC—Experiments made on oat sowings in pans have proved that there exists normally a gradient of water capacity along the stalk of the plant. Changes in soil moisture resulting from sprayings made at various dates affect in a

different way the feeding of the plant. Measuring the water capacity renders possible a foliar diagnosis based on a hydrous disturbance in the feeding of the plant. One notes a reversal of the water capacity gradient which may occur under the effect of a thunderstorm or of too much spraying. This reversal may be harmful to the plant and it provokes early aging of the lower leaves. On the same leaf there exists also a water capacity gradient which decreases from base to summit of the limb. **Subject Headings:** 1. Water feeding of oats 2. Soil moisture effects on oats 3. Water capacity gradient 4. Oats.—A.V.

10N-545

551.521.16:633.13

Wiggans, S. C. and Frey, K. J. (both, Iowa State College, Ames), **Effect of increased daylengths on the production of greenhouse grown oats.** *Agronomy Journal*, Madison, Wisc., 47 (8):387, Aug. 1955. table, ref. **DLC**—By increasing the photoperiod with artificial (fluorescent) lighting, from 10 hrs to 24 hrs, the number of days from planting to heading of oats was decreased from 60 to 43 days for Bond, 58 to 42 days for Clintland, and 65 to 51 for Simcoe, etc. Temperature was kept at 70° in greenhouse at Ames, Iowa. **Subject Headings:** 1. Photoperiodism of oats 2. Oats.—M.R.

10N-546

551.506.8:633.14

*†Müller, Kurt, **Untersuchungen über die Abhängigkeit der Winterroggenreife von der Witterung.** [Investigations on the dependence of the ripeness of winter rye on weather.] *Leipzig. Karl-Marx-Universität. Institut für Agrarmeteorologie, Veröffentlichungen*, 1(3):121-173, 1957. 27 figs., 4 tables, 52 refs. **DWB.** Review by F. Seyfert in *Angewandte Meteorologie*, Berlin, 3(3):93-94, April 1958.—A precise monograph giving the results of a 7-yr (1943-9) study of the phenology of winter rye in Germany and other parts of Central and Northern Europe. Each chapter contains detailed statistical analysis of the available data, and appropriate charts of the spatial distribution of the parameters in Central Europe (mostly Germany). The literature on the phenology and botanical experiments are first reviewed, the observational material described, the effect of mean daily sunshine duration on the phenology based on 1936 and 1937 German data, and on mean data for Germany and on long period records, influence of soil moisture and precipitation from March-June, and influence of length of day are considered in separate chapters. **Subject Headings:** 1. Rye phenology 2. Germany.—M.R.

10N-547

551.583.13:631

Rosenkranz, Friedrich, **Die Zweitfruchtzeit in Niederösterreich im Lichte der Phänologie und Meteorologie.** [After-crop period in lower Austria in the light of phenology and meteorology.] *Wetter und Leben*, 3(9-10):200-203, Nov. 1951. fig., 2 tables. **DWB**—The after-crop period is defined as the time interval between the winter rye harvest and the time when temperature and rainfall are too low to permit cultivation. An index comprised of the total length in days of the after-crop period, mean daily temperature during the period and mean amount of rainfall, is developed for describing the after-crop periods in lower Austria. **Subject Headings:** 1. Rye culture 2. After-crop periods 3. Austria.—I.L.D.

Winter Crops

10N-548

632.111.5

Borisoglebskii, G. I., **Opredelenie zhiznesposobnosti ozimyykh po analizu sostoiianiia konusa narastaniia.** [Determination of the viability of winter crops by analysis of the condition of the cone of accretion.] *Meteorologiya i Gidrologiya*, Leningrad, No. 2:32-33, 1958. **DWB, DLC**—The condition of winter crops was determined by analyzing the apical cone of various samples of five plants from every batch sent for study. These were examined individually and classified on a five ball scale. The results obtained in this manner were compared with the results of the growing of monoliths. The results of these methods agreed in 71% of the cases. The comparison of apical cone analysis with spring inspection shows an agreement of 74%. A comparison of spring inspection with the growing of monoliths showed an agreement of 60%. The apical cone analysis provides a more exact analysis of the condition of winter crops. **Subject Heading:** 1. Winter crop viability —I.L.D.

10N-549

551.578.46:632.111.5

Okushko, A. A., **Kharakteristika ledianoï korki i ee rol' v perezimovke ozimyykh kul'tur na Evropeiskoi territorii SSSR.** [Characteristics of the ice crust and its role in wintering of crops in the European territory of the USSR.] (In: U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby, *Voprosy agrometeorologii*, ed. by F. F. Davitaia and M. S. Kulik. Moscow, 1958. p. 40-44. 12 refs.)—The results of extensive experimental field investigations on the ice crust carried out in different parts of the U.S.S.R. are presented. There were three types of ice crust: (1) formed

from melting snow; (2) formed from liquid precipitation; (3) formed from glazed frost, each having different physical properties. In European U.S.S.R. an ice crust is formed from snow melt in 90% of the cases; in 77% of the cases it is formed from snow melt accompanied by liquid precipitation. Ice crusts and ice layers, consisting of an ice layer in snow, are formed only rarely in most of the U.S.S.R. The former is observed in 56% and the latter in 44% of the cases examined. The crust type is observed in the southwest and the layer type in the northeast. A continuous ice crust is observed rarely (14% of all cases); most frequently it is localized. The ice crust and the ice layer in snow are most frequent in Feb. and March. The duration of such an ice crust in European U.S.S.R. varies from 10 days to 6 months. Experimental studies have shown that the destructive effect of an ice crust upon winter crops is exaggerated; out of 1200 cases of winter crops, wintering under ice crust, only 6% were injured by the ice crust. An ice crust consisting of a layer in snow does not injure winter crops. No direct relationship has been established between damage to winter crops and density, thickness and duration of an ice crust. The relief of a locality influences crops under an ice crust. Damage to winter crops under an ice crust occurs not only during low temperatures even in the absence of low temperatures damage occurs as a result of water stagnation. Ice crusts on the surface of soil rarely damage winter crops. Measures for preventing destruction by ice crusts are discussed. *Subject Headings:* 1. Ice crusts 2. Winter crops 3. U.S.S.R.—I.L.D.

10N-550

551.586:551

Pascale, I. A. J. (Argentina), *Richtlinien für bioklimatische Untersuchungen von Wintergetreiden*. [Instructions for bioclimatic investigations of winter crops.] *International Journal of Bioclimatology and Biometeorology*, Leiden, Vol. 1 (Pt. 2), 1957. 4 p., 4 figs., 6 refs.—The author describes a method for determining the bioclimatic requirements of wheat, oats, etc. All the varieties of a species are sown on small plots at 14-day intervals beginning 2 months before and ending 2 months after the normal planting period. Simultaneously vernalized material is sown. This can be avoided if the experiment is carried out simultaneously in areas which differ fundamentally in their winter climates. Phenological observations are made on beginning of growth, appearance of floral primordium and beginning of ear formation. The phenological data are analyzed by means of the heliothermal index (GESLIN) for the period beginning of growth—ear formation, and for the subperiod beginning of growth—shoot formation, and shoot formation—ear formation. The heliothermal indices of at least three yrs of observations for the entire growth period, arranged according to the time of sowing, are represented on a graph. The curves group themselves into different types with specific bioclimatic needs. Every new variety whose climatic needs are to be determined are subjected to the method of continuous sowing together with a previously determined prototype. The heliothermal index is computed and the curves are compared. Curves of heliothermal indices are presented. *Subject Headings:* 1. Plant bioclimatology 2. Phenology of winter crops.—I.L.D.

10N-551

551.586:551.525.2:551.579.5:633

Ulanova, E. S., *Metodika otsenki agrometeorologicheskikh usloviy perezimovki ozimyykh kul'tur*. [Methods of evaluating the agrometeorological conditions of wintering of winter crops.] (In: U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby, *Voprosy agrometeorologii*, ed. by F. F. Davitaia and M. S. Kulik. Moscow, 1958. p. 45-50. 14 refs.)—The fundamental factors determining the development, growth and condition of winter crops during the fall are heat and moisture of the soil. Where moisture is adequate the fall temperature is decisive. SHIGOLEV has shown that for adequate moisture the emergence of winter rye requires a total effective temperature of 52°C (above 5°C) and for winter wheat 67°. The start of winter rye stem formation requires a total effective temperature of 119° and winter wheat 134°. In areas with inadequate soil moisture the calculation of developmental phases is impossible on the basis of a single temperature index. A special hydrothermal coefficient for growth of seeds and emergence has been developed by N. A. ZUBAREV. Among the various procedures for determining the survival of winter crops the author mentions the formulas developed by A. F. DRUBIUK and A. S. MONIN for computing soil temperatures at the depth of shoot formation; the formula developed by V. P. PEREGUDOV for determining the dependence of the minimum soil temperature at the depth of shoot formation on the minimum air temperature, and height and density of the snow cover in relation to temperature. Equations have been developed for determining the probability of distribution of snow in a field as a function of snow depth. *Subject Headings:* 1. Winter crops 2. Soil temperature effects on winter crops 3. Soil moisture effects on winter crops.—I.L.D.

MISCELLANEOUS

10N-552

551.584.43:551.506.8:633.842

Ajtay, Ágnes, *Fenometria vizsgálat paprikakísérletben*. [Phenometric analysis in a red pepper experiment.] *Időjárás*, Budapest, 63(4):220-221, July/Aug. 1959. 2 tables, 5 refs. DLC—

The soil covering experiments performed at the Agrometeorological Observatory at Martonvásár were carried on to investigate the effects of microclimatic conditions changed by soil covering material. The phenometric analysis aimed to determine the effect of the modified conditions on the growth of the red pepper shrub. Results of phenometric analysis of July 4-24, 1958 are presented along with the meteorological conditions. The growth of the shrubs, the mean values of data, their spread, and achieved significance level are shown on the tables. Maximum growth was shown by the parcels treated with coal powder, followed by the uncovered ones. These dark colored soils are of higher temperature during the period of radiation than the soils covered with plates or straw, indicating that temperature in addition to water supply is an important influence in the growth of red pepper shrubs. *Subject Headings: 1. Phenometric analysis 2. Red pepper shrubs 3. Hungary. 4-O.T.*

10N-553

551.509.612:634.774

Angus, D. E. (*Met. Physics Div., Melbourne*), **The use of heaters for frost prevention in a pineapple plantation.** *Australian Journal of Agricultural Research*, Melbourne, 6(1):186-195, 1955. 7 figs., table, 3 refs. **DLC.** Also issued as reprint by Australian Commonwealth Scientific and Industrial Research Organization.—The degree of frost protection afforded by various concentrations of heaters of a simple design distributed over an area of 1 acre was investigated for a pineapple plantation in southern Queensland. The area over which a temperature rise of a given amount was produced was found to increase linearly with the strength of the temperature inversion. The area also appeared to increase linearly with concentration of heaters over the range 53-188 per acre. This latter concentration produced a temperature rise of at least 3°F over 1 acre, and at least 1°F over 2½ acres. Tests with a combination of these heaters and a wind machine suggested that the areas of various temperature rises were equal to the sum of the areas produced by the two methods used separately. *Subject Headings: 1. Frost protection of pineapple plantations 2. Pineapple plantations 3. Heaters 4. Wind machines 5. Queensland, Australia.—Author's abstract.*

10N-554

551.586:551.521.16:639.64

Bongers, L. H. J., **Changes in photosynthetic activity during algae growth and multiplication.** *Wageningen. Landbouwhoogeschool, Mededelingen*, 58(5):1-10, 1958. 7 figs., table, 10 refs. Summary p. 9. **DLC.**—Some problems in comparing photosynthetic activities of algae cells of different growth stages have been discussed. In terms of unit volume of packed wet cells large variations in photosynthetic activity were observed. These changes are in part attributed to differences in the degree of hydration of the algal cells in different stages of development cycles. On dry weight basis, only small changes in photosynthetic activity were found, which are partly understandable by considering the changes in the ratio of photosynthetically active over photosynthetically inactive cell components in the algae in different stages of cell development. Time course measurements of the rate of photosynthesis per number of cells showed an increase in photosynthetically active cell components which was linearly related to the time of the increase in cell volume. This suggests that the photosynthetic activity during cell development and multiplication remains constant, if referred to a reliable index of photosynthetically active cell components. *Subject Heading: 1. Algae.—Author's abstract.*

10N-555

551.506.8:634.7

Dolgoshov, V. I. (*Inst. Geograph. Acad. Sci. U.S.S.R., Moscow*), **Iagodnyi sezon.** [The berry season.] *Priroda*, Moscow, No. 7:125, July 1956. fig. **DWB, DLC.**—Although the beginning of blossoming and ripening of individual wild berry species takes place in a determined sequence every year, the rate of this sequence is faster in conditions of continental climate (beyond the Volga and the Urals) than it is in the damp climate of the western regions. In individual years, the berry season can deviate from the many years' mean, depending on peculiarities of the spring (early or late) and summer (cold or warm; damp or dry). In the extreme north, due to the length of the Polar day the interval between the successive ripening of berry species is shorter than in temperate zones. A map showing the average time of wild red raspberry ripening in the Soviet Union is included. *Subject Headings: 1. Wild berry phenology 2. U.S.S.R.—A.M.P.*

10N-556

551.586:634.739(74)

*Franklin, Henry J. and Cross, Chester E., **Weather in relation to cranberry production and competition.** *Massachusetts. Agricultural Experiment Station, Bulletin* 450, July 1948. 16 p. refs. **DWB.**—The relation of sunshine, temperature and rainfall at critical periods (from the year before, to Sept. of the current year), to the size of cranberry crops in Mass., the size of the cranberries, their keeping quality, and to specific factors such as development of fungus diseases and injury by heat, sunshine or drought, is set forth in tables and described in text. Continuous records, 1894-1941 (1888-1947 in some cases) are used to correlate weather factors with crop production. *Subject*

Headings: 1. Climatic effects on cranberries 2. Cranberries 3. Massachusetts. I. Cross, Chester R.—M.R.

10N-557

551.586:634.37:632.111

Gerritsen, C. J., De vijk. [The fig.] *Netherlands. Directie van den Landbouw, Mededelingen [van de] Directeur van de Tuinbouw*, The Hague, 21(12):849-853, Dec. 1958. photo, 8 refs. **DLC**—The author examines the resistance of the fig tree to frost in the Netherlands. According to the variety, the wood above ground freezes partially at -10°C or -15°C . But rarely does the whole tree freeze. Suppression of growth in the preceding summer (length of internodes maximum 7.5 cm) increases considerably the resistance to frost. Only fruit formed in spring ripens. Fruit supports only a few degrees of frost, but damage to fruit due to night frost is not mentioned because the figs begin to swell when frost danger is practically over. **Subject Headings:** 1. Fig trees 2. Frost resistance of fig trees 3. Netherlands.—A.V.

10N-558

551.586:633.574:506.8

†Jaramillo, A. G., *Ciclo anual de la floración del cacao*. [Annual cycle of cacao flowering.] *Cacao en Colombia*, 4:159-174, 1955. 10 graphs, 23 refs. **DLC**—The materials and methods of obtaining daily data on production of flowers, and the method of artificial pollination made in order not to affect the physiological state of the trees, are described. The results are presented graphically and are discussed in relation to climatic factors and the leaf flush of the trees. The following conclusions are obtained: 1) In the Cauca Valley, the cacao tree produces flowers and fruits more or less abundantly during the whole year. There exist however, two well marked periods of increased flowering (April-July and Nov.-Jan.); 2) The periods of increased or decreased flowering are positively correlated only with the amount of rainfall; 3) There is no correlation between flowering and the leaf flush of the trees. **Subject Headings:** 1. Cacao phenology 2. Climatic effects on cacao 3. Cauca Valley, Colombia.—From author's abstract.

10N-559

551.586:633

Kmoch, H. G.; Halfmann, H. H. and Sievers, A., *Jahreszeitliche Entwicklung der Würzelmasse unter einer Weide in der Kölner Bucht*. [Seasonal development of root mass under turf in the Kölner Bucht.] *Zeitschrift für Acker- und Pflanzenbau*, Berlin, 105(2):121-143, Feb. 1958. 5 figs., 3 tables, 39 refs. English and German summaries p. 141-143. **DLC**—The seasonal development of the root mass under turf is subject to widely divergent interpretation. This is because of differences of climate, soil and management. Difficulties of method for correctly ascertaining the prevailing trend and the nature of the complex changes in the root mass have to be taken into consideration. Root research carried out over a period of years under one regionally typical, not experimentally specially prepared rye grass pasture, gave under varying conditions (weather, plant content, and use) a basically similar yearly sequence of root development. Modifying influences of rainfall and temperature may be assumed, particularly at the beginning of the "summer depression" (sharp fall in root weight). The basic course of the yearly sequence is given and also the effect of grazing on root development. **Subject Headings:** 1. Rainfall effects on root mass 2. Temperature effects on root mass 3. Root mass.—A.V.

10N-560

551.556.2:634.772(569.4)

Lorch, J., *Windbreaks and windbreak effects in the banana plantations of the Jordan Valley, Israel*. *Israel. Meteorological Service, Ser. A, Meteorological Notes*, No. 17, 1959. 25 p. 15 figs., 18 tables, 14 refs. **DLC**—Data on wind speed and wind effects in banana plantations protected by 4-6 m windbreaks spaced 25 m apart are reported. Per cent reduction in wind speed was independent of the absolute wind velocity. Number of intact leaves, as well as number of tears per leaf, gave good indication of wind conditions. So did measurements of evaporation with Piche evaporimeters even if exposed to sunlight. These instruments are recommended for the study of windiness patterns in small areas. In the first year, plantation wind speeds at 2 m varied from 35-60% of free wind speed. Values above 60-65% of free wind speed are not observed, owing to the self-protecting effect of the plants. This effect increases in subsequent years. The increased protection of dense windbreaks is confined to the plants nearest to them. In a series of 20 plots, each protected by a windbreak, no cumulative effect could be demonstrated. A discussion of the various physical and physiological effects of wind shows these to differ widely in their dependence on wind speed. It is concluded that the marked variation in yield of bananas corresponding to a change from 35-60% of free wind speed seems to be due to the physical damage caused by the wind's tearing the banana leaves, and the concomitant interference with photosynthesis and translocation. This has since been confirmed by hand-tearing of leaves of protected plants. The windward plots of plantations show a pattern of windiness and yield differing from that of subsequent plots, and should be excluded from trials of the profitability of windbreaks. **Subject Headings:** 1. Windbreak effects 2. Wind speed data 3. Banana cultivation 4. Jordan Valley, Israel.—Author's abstract.

10N-561

551.586:635

Malan, E. F., *The production of papawas. Farming in South Africa*, Pretoria, 28 (329):257-262, 1974, Aug. 1953. 5 figs., table. DWB—Under the heading "Climatic and soil requirements" (p. 258), meteorological elements affecting the development of the papaya (*Carica papaya* L.) are discussed. In particular, the effects of frost, heat, soil moisture, air humidity and wind are mentioned. *Subject Headings: 1. Papayas 2. Climatic effects on papayas.—G.T.*

10N-562

551.577:633(540)

Mallik, A. K. (*Met. Office, Poona*), *Height and yield of Kharif Jowar in relation to rainfall during vegetative growth. Indian Journal of Meteorology and Geophysics*, Delhi, 9(4):377-382, Oct. 1958. 5 tables. DWB, DLC—Data collected under the All India Co-ordinated Crop-Weather Scheme was used to examine the effects of rainfall during the vegetative growth period on the growth in height and the yield of grain of Kharif Jowar. Highly significant correlations of height and yield with rainfall deviations show that the greater the deviation of rainfall from the optimum the shorter the crop and the lower the yield. *Subject Headings: 1. Rainfall effects on Kharif Jowar 2. Kharif Jowar 3. India.—N.N.*

10N-563

551.586:633.3

Wolford, L. V. (*Climatological Services Div., U. S. W. B.*), *Soybeans. U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 42(41):7-8, Oct. 10, 1955. DWB—A survey of the development of soybean cultivation in the United States, giving ample information on the history of its expansion, the areas of present cultivation, expected production in 1955, the multitude of varieties developed ranging in the time required for maturity from 75-200 days, allowing one to extend the culture of soybeans far beyond their natural limits. Further information deals with the types of soils, the appearance of the plant and seeds, the cultivation of the fields, the time and methods of drilling and harvesting, the methods of processing the seed for oil, meal, etc. *Subject Headings: 1. Soybean cultivation 2. United States.—A.M.P.*

10N-564

551.586:551.524:634.613

Minz, G., *Two Diplodia species in date palm. Rehovot, Israel. Agricultural Research Station, Ktavim, Records*, 8(3/4):213-216, Aug. 1958. fig., 2 tables, 5 refs. DLC, NN—Optimum mycelial growth, observed at temperatures from 8°-43°C, was obtained at 25°C. No growth was made by *D. phoenicum* when cultures were kept at 37°C for 11 days, whereas *D. natalensis* yielded some growth at this temperature after 5 days. On the other hand, at a temperature of 8°, *D. phoenicum* grew after 8 days, as compared with 14 days for *D. natalensis*. Normal growth of *D. phoenicum* continued after transfer to 25° of cultures previously held at 37°C for 11 days, or at 43°C for 3 days, but no growth occurred in cultures after 8 days at 40°C. *Subject Headings: 1. Date palms 2. Temperature effects on date palms.—A.V.*

10N-565

551.586:634.613

Nixon, Roy W. (*U. S. Date Garden, Indio, Calif.*), *Ecological studies of date varieties in French North Africa. Ecology*, Lancaster, Pa., 33(2):215-225, April 1952. 4 figs., 3 tables, 9 refs. DWB—The climatic conditions necessary for date culture are discussed briefly and climatic data (maximum air temperature May-Oct., the minimum Jan. temperature, average monthly rainfall from July-Oct. and annual rainfall) for various districts in French North Africa where dates are grown, are presented in a table. *Subject Headings: 1. Date climates 2. French North Africa.—I.L.D.*

10N-566

551.524:631.563 551.571:631.563

*Gladstones, J. S. (*Inst. of Agri., Univ. of Western Australia, Nedlands, W. A.*), *Influence of temperature and humidity in storage on seed viability and hard-seededness in the West Australian Blue Lupin, Lupinus digitatus Forsk. Australian Journal of Agricultural Research*, Melbourne, 9(2):171-181, March 1958. 4 figs., 5 tables, 8 refs. DWB, DLC—Freshly harvested seeds of *L. digitatus* were stored for up to 11 months at all combinations of six constant temperatures and five constant relative humidities. Testing for hard-seededness was done by soaking in water at 15°C, and for viability by emergence tests in seed boxes. Permeability was found to be governed by seed moisture content. All seeds with more than 14% moisture (wet weight basis) remained fully permeable. Below 14%, permeability decreased with decreasing moisture content until at 11% all seeds were virtually impermeable. Impermeability was readily reversible under humid conditions down to 12% moisture content, but practically irreversible below 9%. Softening of semihard seeds took place no more rapidly at 94% R.H. than at 76%. Seed which was air drying in the laboratory remained fully soft for about 1 week after harvest, and thereafter hardened only slowly. Seed which had been kept permeable for 12 months hardened at the same rate. Viability was impaired by both high moisture content and high temperature. *Subject Headings: 1. Seed storage 2. Seed viability 3. Temperature effects on seed storage 4. Humidity effects on seed storage 5. Seed moisture content 6. Seed hardness.—Author's abstract.*

ATMOSPHERIC CONDITIONS AND ANIMALS AND INSECTS

ANIMALS

10N-567

551.586:636.92:612.5

Binet, Pierre, *La température limite de réchauffement spontané du lapin rendu hypothermique par l'association magnésium-insuline*. [Limit temperature for spontaneous warming up by the rabbit rendered hypothermic by means of magnesium-insulin combination.] *Académie des Sciences, Paris, Comptes rendus*, 248(21):3039-3040, May 25, 1959. 4 refs. DWB, DLC—The slow administration of an intravenous magnesium solution, isotonic to plasma and containing insulin, causes progressive hypothermia if the experiment is made in a cold medium. Author investigates the limit temperature for which spontaneous warming up of the animal is possible. Experiments prove that temperature equal to $+25^{\circ}$ is, for the rabbit, the limit temperature below which life is definitely jeopardized. If the temperature of the rabbit is brought lower than $+24^{\circ}$, the animal cannot warm itself spontaneously and dies after a more or less long time. It is thus necessary to warm it up artificially to $+25^{\circ}$ or $+26^{\circ}$ so that it comes back again to its normal temperature and survives. Comparison with hibernation is discussed and the role of magnesium specified. *Subject Headings*: 1. Hypothermia 2. Animal bioclimatology 3. Rabbits.—A.V.

10N-568

551.585.5:551.586:599.9

†Bodenheimer, F. S., *The ecology of mammals in arid zones*. UNESCO *Arid Zone Research*, 8:100-137, 1957. 12 figs., table, 154 refs., 3 pl. French summary p. 132-134. DWB (M86.599.9:U58h)—World literature on the life of mammals in desert regions is reviewed in sections on water and water metabolism, body temperature, burrows, wind, food habits, reproduction, diel (24-hr cycle) activity, sociability, vagility, populations, desert coloration, morphological adaptations, zoo-geography, epizootics and domestic stocks. *Subject Headings*: 1. Animal bioclimatology 2. Mammals 3. Arid zones.—G.T.

10N-569

551.586:551.594.1:636.0

Büchi, Hans F., *Die biologische Bedeutung des luftelektrischen Feldes für die Gesundheit unserer Haustiere*. [Biological effect of the atmospheric electric field on the health of our domestic animals.] *Der Kleinviehzüchter*, Romanshorn, Switzerland, 6(2):27-28, Jan. 1958.—Author thinks that the fair weather electric field might have a stimulating effect on blood circulation and might increase the natural endurance to diseases. Tests have been made in cattle sheds with artificial electrodes. By this means, it was at the same time possible to purify the air. *Subject Headings*: 1. Animal bioclimatology 2. Domestic animals 3. Atmospheric electric field effects on animals.—A.V.

10N-570

551.524:598.8

Chadwick, L. E. and Rahn, Hermann (*Rochester Univ. School of Medicine and Dentistry, N. Y.*), *Temperature dependence of rattling frequency in the rattlesnake, Crotalus v. viridis*. *Science*, 119(3092):442-443, April 2, 1954. fig. Also issued in: *Science News Letter*, 65(16):247, April 17, 1954. DWB—Curve shows straight line relationship between body temperature and rattling frequency in *Crotalia v. viridis* from 8° - 36° C. Data were obtained from 18 adult male and female rattlesnakes removed from a den near Cheyenne, Wyo. Snakes were placed in an icebox and left for 1-2 hrs. Two hundred and twenty-six observations were taken. Rattling frequency at 41° C would be 100 cps which compares with wing beat of humming bird or various insects, which is 75 cps at similar body temperatures. *Subject Headings*: 1. Temperature effects on rattlesnakes 2. Rattlesnakes.—M.R.

10N-571

551.586:636.2

*Findlay, J. D. (*Hannah Dairy Res. Inst., Kirkhill, Ayr, Scotland*), *The physiological effects of climatic stress on the bovine animal*. *International Journal of Bioclimatology and Biometeorology*, Leiden, Netherlands, Vol. 2, (Pt. 3), 1958. 4 p. 11 figs., 3 refs. DWB—With the aid of data presented in graphic form the author reviews available knowledge on the effect of thermal stress upon the physiology of young and adult cattle: on temperate breeds of cattle, and crossbreeds of temperate and tropical breeds. The principal physiological effects are increase in rectal temperature, respiratory frequency and heart rate; change in milk yield and composition of the milk and blood; but very little effect on the water and electrolyte balance of the animals. Considerable differences were found in the heat tolerance of different breeds of cattle. A detailed account is given of the results of experiments on thermal stress on calves carried out at the Hannah Institute (Kirkhill Ayr, Scotland). The results of these experiments are presented in graphs. *Subject Headings*: 1. Temperature effects on cattle 2. Animal bioclimatology.—I.L.D.

10N-572

551.586:591.54

Folk, G. Edgar, Jr. and Farrand, R. L., **Hibernation as a bioclimatological response.** *International Journal of Bioclimatology and Biometeorology*, Leiden, Vol. 1 (Pt. 3), 1957. 2 p.—Two populations of thirteen-lined ground squirrels and hamsters, which have a natural habitat that ranges from the shores of Texas to the Hudson Bay Region, were investigated under laboratory conditions by maintaining some individuals for their entire lifetime at typical animal room temperatures and by permitting litter mates of these animals to hibernate for each of two or three winters for four months. Cold acclimatization and hibernation in these animals are described. More food is consumed each day; body weight is lost beginning the first day of cold exposure; water consumption is initially very low, then high; oxygen consumption is initially very high, then levels off; new high level persists at room temperature. All these effects and others mentioned take from six to eight days of cold exposure. After they are completed, about 75% of the animals eventually hibernate. During hibernation their heart rate, metabolism and respiration fall to a very low value. Hamsters awakened at random from hibernation, 50% in light and 50% in darkness. Populations experiencing hibernation differ physiologically from those that do not hibernate. The function of hibernation is "metabolic parsimony." There is evidence that hamsters that hibernate live longer. *Subject Headings: 1. Hibernation 2. Cold acclimatization 3. Squirrels 4. Hamsters.—I.L.D.*

10N-573

551.586:551.521.1:612.1:636.293

Hafez, E. S. E.; Maghrabi, M. H. and Anwar, A. (Fac. of Agricult., Cairo Univ.), **Some factors affecting blood cholesterol level in the buffalo, in the sub-tropics.** *The Indian Journal of Veterinary Science and Animal Husbandry*, New Delhi, 28(3):133-138, Sept. 1958. 3 figs., table, 8 refs. **DLC**—Sixteen healthy, adult Egyptian buffalo cows were used in three experiments to determine the effect of season, direct solar radiation and pregnancy on blood cholesterol level. Atmospheric temperature ranged from 52°-84°F. The level of blood cholesterol ranged from 88-115 mg per 100 ml. Data obtained indicate a reciprocal association between cholesterol and the atmospheric temperature; a decrease in blood cholesterol after exposure to direct solar radiation; and a rise in blood cholesterol after the fifth month of pregnancy. In the buffalo, seasonal variation in blood cholesterol level is not as marked as in European cattle. The practical application of the relationship of blood cholesterol to heat tolerance is discussed. *Subject Headings: 1. Buffalos 2. Blood cholesterol 3. Solar radiation effects on blood cholesterol 4. Temperature effects on blood cholesterol.—A.V.*

10N-574

551.524:591.5

Jägersten, Gösta (Zoological Inst., Uppsala), **Life cycle of *Dinophilus*, with special reference to the encystment and its dependence on temperature.** *Oikos*, Copenhagen, 3(2):143-165, 1953. **DLC**—These creatures remain encysted at high summer temperatures and do not survive at extremely low temperatures. Studies show that although remaining encysted, their length of life is 3 times as great when kept at room temperatures as when kept under natural conditions. Optimum temperature is about 6°C. Thus it is found that the species is not inhibited by the low summer temperatures on the Swedish Coast but by high winter temperatures. It is not to be found in regions where the water temperature does not fall below 14°C, during 3 months of the year, indicating that its original home was in northern rather than southern regions. *Subject Headings: 1. Temperature effects on animals 2. Animal bioclimatology.—M.R.*

10N-575

551.524:551.586:591.13

Kment, A. (Austria), **Die Nahrungsaufnahme bei verschiedenen Temperaturen im Tierversuch.** [Nutrition assimilation at different temperatures in animal research.] *International Journal of Bioclimatology and Biometeorology*, Leiden, Netherlands, Vol. 2 (Pt. 3), 1958. 2 p. 4 figs.—The author presents the results of an experiment on the influence of so called normal temperature (22°C), of cold (-15°C) and heat (+70°C - +100°C) upon the food intake of rats. The experimental procedure is described and the results of the experiments are presented in tables and graphs. A significant difference in sojourn (food intake) in temperature chambers existed among rats in the case of normal temperature, cold and warmth. The total sojourn in cold and heat was about the same but the food intake was 2:1. The average weight loss of the individual rat, in spite of practically equal sojourn at -15°C and +70°C and a double time per individual sojourn at -15°C as against +70°C was three times as large in the cold experiments as in the heat experiments. *Subject Headings: 1. Temperature effects on rats 2. Nutrition 3. Animal bioclimatology.—I.L.D.*

10N-576

551.586:59:619

Koller, Raphael (Austria), **Die Bedeutung der Klimatologie für die Tierheilkunde.** [The significance of climatology in veterinary science.] *International Journal of Bioclimatology and Biometeorology*, Leiden, Netherlands, Vol. 2 (Pt. 3), 1958. 3 p. **DWB**—The fundamental work of BRODY, FINLAY, etc. on the effect of climatic elements upon the physiology of cattle, serves as a foundation for the study of the role of bioclimatology in veterinary medicine. Another extensive

field of practical application of bioclimatological concepts in veterinary science is the group of mammalian diseases among domestic animals. The increased death rate among the newly born domestic animals is regarded as the result of the fact that homeothermy is not yet fully established and that the newly born are in part poikilothermic. Homeothermy of the adult domestic animals operates within a restricted range with an undetermined lower limit but with an upper limit between 20 and 40°C. The harmful effects of high temperature upon domestic animals are illustrated by losses during transport of large animals. Little is known of the effect of light and weather situations upon domestic animals. Indications exist that certain diseases such as equine colic, are associated with humid cold weather situations. *Subject Headings:* 1. Animal bioclimatology 2. Veterinary medicine.—I.L.D.

10N-577

551.524:612.44:597.555

Leloup, Jacques, **Influence de la température sur le fonctionnement thyroïdien de l'anguille hypophysectomisée.** [Influence of temperature on the thyroid of the hypophysectomized eel.] *Académie des Sciences, Paris, Comptes Rendus*, 248 (3):463-466, Jan. 19, 1959. fig., 5 refs. DWB, DLC—Experiments made on eels show that changes in temperature of the external medium do not markedly modify the thyroid functioning of hypophysectomized eels, when thyroid of normal eels is activated to a considerable extent through an increase of temperature. The temperature factor thus acts on the thyroid gland through hypophysar relay. Since the need of thyroid hormones increases at high temperatures, the diminution of the flowing hormonal stock becomes greater at high temperatures and, therefore, the hypophysar reaction resulting from this diminution will be rapid and strong. *Subject Headings:* 1. Thyroid functioning of eels 2. Eels 3. Temperature effects on thyroid of eels.—A.V.

10N-578

551.524:597.555

Leloup, Jacques, **Influence de la température sur le fonctionnement thyroïdien de l'anguille normale.** [Influence of temperature on the thyroid of the normal eel.] *Académie des Sciences, Paris, Comptes Rendus*, 247 (25):2454-2456, Dec. 22, 1958. fig., 9 refs. DWB, DLC—Experiments made on silver eels show that the temperature of the external medium influences strongly the thyroid of the normal eel. At high temperatures the fixation of iodine and its organic binding in the thyroid, the synthesis of thyroid hormones and their release in the internal medium are much faster than at low temperatures. *Subject Headings:* 1. Thyroid of eels 2. Eels 3. Temperature effects on thyroid of eels.—A.V.

10N-579

551.585.7:636:612.5

Lörtscher, H., Rieder, J. and Mörikofer, W., **Influence du climat d'altitude sur la production animale.** [Influence of high altitude climate on animal breeding.] *European Association for Animal Production, Publication*, No. 5:114-146, 1957. 5 figs. DLC. Shorter version issued in *Agriculture*, Paris, No. 204:237-241, Sept. 1958. 5 figs. DA—Essential characteristics of high altitude climate are reviewed. During grazing, cold and strong radiation affect the thermoregulation phenomena and the physiological condition of the animals. Results include an increase in longevity and fecundity. *Subject Headings:* 1. Animal husbandry 2. High altitude climatic effects on animals 3. Thermoregulation.—A.V.

10N-580

551.524:551.571:636.31

Riek, R. F.; Hardy, Margaret H.; Lee, D. H. K. and Carter, H. B., **The effect of the dietary plane upon the reactions of two breeds of sheep during short exposures to hot environments.** *Australian Journal of Agricultural Research*, 1(2):217-230, April 1950. 4 figs., 5 tables, 9 refs. DLC (S17.A94)—Graphs show effect of varying air temperature ranging from 30°C (86°F)-45°C (113°F) and of varying humidity (15 mm-40 mm vapor pressure) on rectal temp. and respiratory rates and volume, of two breeds of ewes (Camden Park Merino and Corriedale) with different planes of nutrition and hours of exposure. Evaporative losses, food and water consumption, body growth, pulse rate, and behavior were also considered quantitatively. Sheep of both breeds proved remarkably tolerant to long exposure in a hot environment except when subjected to a very high or low nutritional diet. *Subject Headings:* 1. Temperature effects on sheep 2. Humidity effects on sheep 3. Queensland, Australia.—M.R.

10N-581

551.586:636.5

Skachkov, —, **Vyrashchivanie tsipliat pri ponizhennoi temperature i periodicheskom pokoe.** [Raising of chickens at lower temperature and with periodic rest.] *Pitisevodstvo*, Moscow, No. 6:12-13, June 1953. DLC—Brief account of experiments in raising pullets subjected to temperatures gradually reduced from 25-26°C to 18°C over a 30-day period. *Subject Headings:* 1. Poultry husbandry 2. Animal climatology.—M.R.

10N-582

591.12:636.21:551.524.33

Schindler, H., **Seasonal variations in body temperature and respiration rate of bulls.** *Rehovot, Israel. Agricultural Research Station, Klavim. Records*, 8(1/2):33-38, Feb. 1958. fig., 4 tables, 1 refs. **DLC, NN**—Respiration rate and body temperature of bulls were measured during a number of summer days, and on 2 days in each of 12 consecutive months. Respiration rate was low during winter, rose gradually in spring, reached its maximum in July and Aug., and decreased during the summer months. Body temperature was low in winter, rose in spring, and remained at a constant level till the end of autumn. Only in a few instances did the body temperature rise significantly above 39°C (the normal value). Whereas a very significant correlation was found between respiration rate and daily mean air temperature, none was found between body and daily mean air temperatures except in the morning measurements. *Subject Headings: 1. Bulls 2. Temperature effects on bulls.*—A.V.

10N-583

591.12:636.21:551.524.33

Schindler, H., **Summer and winter scrotal skin temperatures of bulls, as compared to temperatures of other body parts.** *Rehovot, Israel. Agricultural Research Station, Klavim. Records*, 8(1/2):39-43, Feb. 1958. 2 tables, 17 refs. **DLC, NN**—Surface skin temperatures of the back, abdomen and scrotum, and rectal temperatures of bulls in the Jordan Valley and coastal plain were measured in both winter and summer. The surface skin temperatures of the back, abdomen and scrotum were 4-7°C higher in summer than in winter. The rectal temperature was only slightly above normal in summer. The surface skin temperature of the scrotum was about 2-4°C less than that of the abdomen or back. The direct heating of the scrotum during summer rather than the general heating of the body appears to be a factor in the reduced fertility of bulls in summer and autumn. *Subject Headings: 1. Bulls 2. Temperature effects on bulls.*—A.V.

10N-584

551.577.38:551.579:631.468.516(494)

Stöckli, A., **Die Regenwurmarten in landwirtschaftlich genutzten Böden des Schweizerischen Mittellandes.** [Earthworms in soil under cultivation in Central Switzerland.] *Annuaire Agricola Helvetica*, Lausanne, n.s., 7(6):699-725, 1958. 12 figs., 8 tables, 16 refs. **DLC**—Ecological study of earthworms in Swiss soil. Under certain conditions, the number of earthworms compared to the mass of animal life in soil, meadows and cultivated areas of the Swiss plateaus may reach 30%. In this study, from a climatological point of view one shall remember that prolonged drought periods are disastrous to earthworms. The author explains the means of defense of earthworms against dryness. Physical properties of soil, its humidity, its hydrogen ion concentration, vegetation, amount and distribution of precipitation during the year, control the emergence of species and play an important part in their ecology. *Subject Headings: 1. Earthworm ecology 2. Switzerland.*—A.V.

10N-585

551.586:551.524.36:618.2:636.28

Taneja, G. C. (Dept. of Physiology, Univ. of Queensland, Australia), **Effect of high air temperature on pregnancy in cattle.** *The Indian Journal of Veterinary Science and Animal Husbandry*, New Delhi, 1(2):101-107, June 1958. 3 tables, 24 refs. **DLC**—Twelve Australian Illawara Shorthorn cows were divided into four groups of three cows each. One group acted as a control. Animals in the other three groups were heated for periods centering around 10th, 30th and 50th days of pregnancy, respectively. These animals were again heated at about 4 months' pregnancy. The heat exposure for experimental animals lasted for 7-8 days at an average room temperature of 105°F dry-bulb and 100°F wet-bulb. During the entire heat exposure, the morning body temperature of the experimental animals was higher than that of controls, while the evening body temperature reached a critical level of 106-107°F each day. Under these conditions of heat stress, the pregnancy in all the Australian Illawara Shorthorn cows proceeded normally with one exception when the pregnant animal after treatment returned to oestrus. Body weights of the calves born to heat treated cows were the same as that of the controls. It appears that this breed is relatively well adapted to hot environments. *Subject Headings: 1. Physiology of cows 2. High temperature effects on pregnancy in cattle.*—A.V.

10N-586

551.524:636.5

Van Ness, Glenn, **Weather influence in blue comb in chickens.** *Science*, 118(3072):601-602, Nov. 13, 1953. table. **DWB**—A survey of the chicken disease, blue comb, as connected with excessive temperature, was conducted with the cooperation of five New England diagnostic laboratories. A correlation appears to exist between outbreak of the disease and high air temperature. An attempt was made to predict dates of occurrence of blue comb. Results of this attempt are tabulated for 1952. *Subject Headings: 1. Temperature effects on chicken diseases 2. Poultry husbandry.*—G.T.

10N-587

551.586:599.322

***Wühlmausbekämpfungsversuch mit Endrin-Präparaten.** [Destruction of the meadow mouse with endrin preparations.] *Gesunde Pflanzen*, Frankfurt a. Main, 10(3):57-59, March 1958. DA—The hypothesis that meadow mice come to the surface at night during certain weather conditions was confirmed during two trials of mouse destruction on Oct. 28, 1957 and Nov. 11, 1957 in the Starnberg District. A mild night temperature is required. Pressure, maximum and minimum temperatures and rainfall for the two periods are presented in tables. *Subject Headings: 1. Mice. 2. Climatic effects on mice.—A.V.*

10N-588

551.521.16:551.586:636.2

Yeates, N. T. M. (*Univ. of Queensland*), **Photoperiodicity in cattle, Pt. 1, Seasonal changes in coat character and their importance in heat regulation.** *Australian Journal of Agricultural Research*, Melbourne, 6(6):891-902, Nov. 1955. 2 figs., 3 plates, 5 tables, 13 refs. DWB—The seasonal changes in coat character of a control group of four young Poll Shorthorn cattle have been studied and compared with those of a similar group in which the daily photoperiod was altered to simulate the synchronous duration of daily lighting of the opposite (northern) hemisphere. Heat tolerance tests were conducted periodically as the animals assumed different coat types. The results show that the full range of coat changes which characterize well nourished cattle of the type used in this experiment may, irrespective of seasonal temperature, be reversed by artificially reversing the seasonal trend of daylight duration. This is presumptive evidence that the natural light environment is a major controlling factor in the normal pattern of seasonal coat change which cattle of European origin exhibit. Cattle with sleek, summer-type coats have shown decisive heat tolerance superiority over those with deep, winter-type coats under the conditions of the experiment. Clipping tests indicate that it is the heavy coat itself which lowers heat tolerance, not a particular internal condition (metabolism, for example) with which heavy-coatedness might be associated. *Subject Headings: 1. Photoperiodism of cattle 2. Heat tolerance of cattle.—Author's abstract.*

INSECTS

10N-589

551.524.36:595.3

Balakrishnan, Nair N. and Leivestad, H. (*Biological Station, Bergen Univ., Espesgrend, Norway*). **Effect of low temperature on the vertical distribution of two woodboring crustaceans.** *Nature*, London, 182(4638):814-815, Sept. 20, 1958. fig., 4 refs. DLC—The control experiments described and discussed were conducted at the University of Bergen, Biological Station Espesgrend, Norway reproducing natural conditions as far as possible. The purpose was to check the crustaceans inhabiting an inter-tidal zone for their extent of tolerance and to look for any evidence of adaptability to sudden temperature drops. The results presented in curves feature lethal exposure to air temperatures in time periods of 4, 6 and 8 hrs, using 50% mortality as the tolerance limit. It is shown that -4°C had no serious effects but exposed to -8°C in 8 hrs the *Limnoria lignorum* species reached the tolerance point which would be encountered in 4 hrs by the *Chelura terebrans* species. The lowest possible temperature for survival at all was -18°C . *Subject Headings: 1. Low temperature effects on crustaceans 2. Cold tolerance of crustaceans 3. Crustaceans.—W.N.*

10N-590

551.585.53:551.586:591.5:595.7

†Pradhan, S., **The ecology of arid zone insects (excluding locusts and grasshoppers).** *UNESCO Arid Zone Research*, 8:199-240, 1957. 4 figs., 649 refs. French summary p. 222-224. DWB (M86:599.9 U58h)—This impressively extensive review of world literature deals with properties and distribution of insects under specific desert conditions. The particular problems reviewed are color adaptation, development of special morphological characteristics and modified organs, modification of the internal anatomy, physiological acclimatization, and geographic distribution of various species, discussed by continents or regions. Each of these aspects is treated in considerable detail and thoroughly documented. *Subject Headings: 1. Arid zone ecology 2. Insect ecology.—G.T.*

10N-591

551.521.16 595.78

Yamazaki, Hisashi; Nishimura, Kunio and Yamada, K. (*all, Matsumoto Branch, Nagano Sericultural Experiment Station*), **How much of the intensity of light had a control to the oviposition of the female moth of *Antheraea pernyi* G.?** *Journal of Agricultural Meteorology*, Tokyo, 12(4) 135-137, March 1957. 5 tables, 9 refs. In Japanese; English summary p. 137. DWB—This experiment was carried out to discover the relation of light to the oviposition of *Antheraea* moths which ordinarily deposit their eggs at night, stopping at dawn. The increasing light which suppresses the oviposition of the moth was measured. The results are as follows: (1) Daylight of 20 Lux partially inhibits the oviposition of the moths, 30 Lux most of the moths, and 40 Lux all of the moths. (2) The

tensity of the increasing light reaches the effective degree within 20–30 min at dawn. *Subject Headings:* 1. Light effects on insects 2. Moths.—*Authors' abstract.*

10N-592

551.524:638.2:613.24

Jolly, Manjeet, Singh and Legay, Jean-Marie, *Alternance de température et résistance au jeûne chez les chenilles nouveau-nées de Bombyx mori*. [Alternation of temperature and fasting resistance of the newborn caterpillars of *Bombyx mori*.] *Académie des Sciences, Paris, Comptes Rendus*, 8(6):858–860, Feb. 9, 1959. table, 3 refs. **DWB, DLC**—Part played by temperature in the research concerning fasting resistance of newborn silkworms. A relatively short variation in temperature entails, after treatment, an alteration of metabolism, the duration of which exceeds the duration of treatment. Moreover, alteration generally arises in the opposite direction from that which appeared during the treatment itself and thus plays a compensatory role. Caterpillars maintained at a low temperature withstand longer fasting, if they are subjected to short exposures at 22°C temperature at which the death rate is generally higher than at -2° or -5°C . *Subject Headings:* 1. Silkworms 2. Fasting resistance of silkworms 3. Temperature effects of silkworms.—*A.V.*

10N-593

551.586:595.78

Post, J. J. and de Jong, D. J., *De invloed van de temperatuur op het tijdstip van verpoppen en de duur van het popstadium van Enarmonia pomonella L.* [Influence of temperature on the date of pupation and emergence of the codling moth, *Enarmonia pomonella L.*] *Tijdschrift over Plantenziekten*, Wageningen, 64:130–141, 1958. 9 figs., 2 tables, 4 refs. **DA, DLC**—Preliminary investigations of the influence of differences of temperature due to artificial irradiation on the pupation of the codling moth (*Enarmonia pomonella L.*) have shown that in intensively irradiated pieces of the bark, the pupation began earlier than in less intensively irradiated pieces. About three weeks after the beginning of the experiment, 70% of the larvae in the intensively irradiated bark were pupated, against 30% in the less intensively irradiated part. A second experiment was set up to study the effect of temperature on the emergence of the codling moths. Some days before the beginning of the experiment, a stem with about 200 full grown larvae was exposed in the laboratory to a temperature of 30°C. After four days no larvae were found, so it was assumed that the pupation was completed. The irradiation experiment showed that the emergence of the moths in the intensively irradiated part of the stem began five days earlier than in the shadowed (not irradiated) part of the stem. In the intensively irradiated part of the stem, the 50% level was reached 15 days earlier; the end of the flight came in the intensively irradiated part about three weeks earlier than in the shadowed part of the stem. Some data on the emergence of the codling moth drawn from an experiment of EVENDYKUS (1951) were used for a "prediction" of the pupation of the larvae. *Subject Headings:* 1. Codling moths 2. Temperature effects on codling moths.—*Authors' abstract.*

EPIDEMIC DISEASES OF ANIMALS

10N-594

551.586:591.2

Carton, P. and Vittoz, R., *Rôle des facteurs climatiques dans l'évolution des épizooties*. [Role of climatic factors in the evolution of epizootics.] *International Office of Epizootics, Paris, Bulletin*, 8(5):533–570, May, 1957. bibliog. p. 566–570.—Investigation of the role of climatic factors in the evolution of epizootic diseases. A balance has been struck of the knowledge actually available concerning scientific research and practice. Climatic factors are subdivided into extraterrestrial elements (solar radiation, infrared and ultraviolet radiations, duration of the day), meteoric elements of air, soil and water (temperature, pressure, humidity, evaporation) and telluric elements (radioactive efflux). A survey of the action of physico-pathological climatic factors on animals in their milieu and effect of climatic factors on evolution of epizootics is included. Authors investigate the favorable or unfavorable action of microclimate (cattle sheds), ecoclimate (natural site) and macroclimate (regional climate) on animals attacked by an infectious disease, during the evolutive stage. Microbial diseases and virus diseases are examined in the light of climatic factors. For diseases with obligatory by-dweller or insect vehicle, microbial diseases, virus diseases, diseases due to macroscopic parasites, etc., it is possible to delimit the geographic area of disease spread through examining climatograms which specify the vital requirements of such an insect or such a parasite with regard to climate. Before reaching conclusions and examining the importance of the development of animal climatopathology, authors investigate influence of climatic factors on setting, duration and cessation of natural or acquired immunity. *Subject Headings:* 1. Animal climatopathology 2. Epizootics 3. Ecoclimatology.—*A.V.*

10N-595

551.54:616.988.4

Primault, B., *De l'influence des variations de la pression atmosphérique sur l'apparition de la fièvre aphteuse*. [Influence of the variations of atmospheric pressure on the occurrence of foot and

mouth disease.] *Schweizer Archiv für Tierheilkunde*, Zurich, 97(9):412-422, 1955. 2 figs. (1 fold.), 6 tables, 13 refs. **DA, DLC, DSG**—The relationship between the date of outbreak of foot and mouth disease and weather and barometric pressure was investigated on the basis of 245 cases occurring in Switzerland over the period 1922-1952. It was found that a low barometric pressure prevailed 36-48 hrs before the manifestation of disease symptoms. These observations were noted only for natural infections and not for massive laboratory tests. *Subject Headings*: 1. Meteorological effects on foot and mouth disease 2. Foot and mouth disease 3. Switzerland.—I.L.D.

10N-596

551.586:551.543.5:616.988.143

Primault, B. (*Institut suisse de Météorologie, Zurich*), *Éléments météorologiques agissant sur l'apparition et l'extension de la fièvre aphteuse*. [Influence of meteorological factors on the appearance and spread of foot and mouth disease.] *Archiv für Tierheilkunde*, Zurich, 100(7):383-399, July 1958. 5 figs., 7 tables, 12 refs. German, Italian and English summaries p. 398-399. **DNLM**—In 1955 the author described in this journal the influence of certain alterations of atmospheric pressure on the appearance of foot and mouth disease, noting a considerable decrease of the pressure 48 hrs before the outbreak. The various possibilities of such an influence are now investigated. Again he states, that in a number of cases the decrease of pressure alone is not a sufficient explanation. During the outbreaks of the disease from 1953 to the beginning of 1957 he finds that besides the fluctuations of atmospheric pressure the changes of the daily number of electromagnetic waves of great length (11 km or 27 Kc/s) also are of decisive influence. (This number increases four days before outbreak). The disease appears only if all of the meteorological factors appear in the above mentioned order at certain time intervals. This hypothesis is supported by a number of observations. The author thinks that a survey of the meteorological factors may be a valuable help in controlling the disease. *Subject Headings*: 1. Foot and mouth disease 2. Meteorological effects on foot and mouth disease.—*Author's abstract*.

10N-597

551.586:591.2:636.22

Rousselot, R., *Biotopes des ixodes en Afrique Noire Française*. (Influences sur la pathologie en fonction du climat, de la répartition et de la densité des espèces.) [Biotopes of ixoda in French Black Africa (Influence on pathology with regard to climate and to distribution and denseness of species).] *International Office of Epizootics, Paris, Bulletin*, 47(9-10):645-652, Sept./Oct. 1957. ref. **DLC**—The considerable differences between diseases conveyed through ticks between the Sudanese and Western Saharian rearing zone situated North of the forest belt, and the Savanna rearing zone situated South of this belt, are presented. The author draws a parallel between this fact and the climate in the two zones. Climate, which determines distribution and denseness of the tick species as well as feeding conditions, is indeed different in regard to temperature, precipitation and distribution of rainfall. On this account, it follows that cattle raised in the southern zone suffer a percentage of loss owing to diseases conveyed by ticks, but much smaller than the northern zone, the present differences between the respective numbers of the bovine population in the two zones being considered. This study should create an interest in cattle raising in this region which offers, moreover, the important characteristic of being free from cattle plague and peripneumonia. *Subject Headings*: 1. Cattle diseases conveyed by ticks 2. Climatic effects on cattle diseases 3. French Equatorial Africa.—A.V.

ANIMAL AND INSECT PHENOLOGY

10N-598

551.506.8:595.7335

Itô, K., On the phenological observation and the extreme decrease of dragonfly in Yamagata District. *Japan. Meteorological Agency, Tokyo, Memoirs of Industrial Meteorology*, 22(1):53-59, 1958. fig., 2 tables, 2 refs., eq. In Japanese; English summary p. 59. **DLC**—Recently, wild birds, fishes and insects have been decreasing in number so rapidly, phenological observations by weather stations are becoming more difficult each year. To get rid of this difficulty, the writer suggests here that some birds and insects be added to the phenological observation articles. On the one hand, the articles of botanical observation are centered in spring, i.e. April and May have 9 botanical articles out of 11, and the months Jan., Feb., March, July, Aug., Oct. and Dec. have none. In order to better the present state, we should add observations of the ripening date of various plants which bloom in other seasons. It is reported from many districts that a remarkable decrease of swallows has been occurring in Japan since 1954. The writer estimates the degree of decrease to be about 10^{-1} in the city of Kanazawa, by observing the number of nests into which swallows come back each spring. It is noteworthy that the arrival date of swallows does not change very much. In the case of the dragonfly, the decrease must be greater than in the case of the swallow, because the arrival date of 1957 has been delayed unprecedentedly. The writer roughly estimates the decrease to be about 10^{-2} - 10^{-3} or more. Many kinds of dragonflies and one variety of fireflies also show the same tendency. All of them have a period of life in the water. But the insects which live on land through

life show no delay in the first date, though they have decreased to the degree of 10^{-1} or so. The water attributes the cause to the agricultural chemicals which dissolve in the water. And if the present state of affairs should continue throughout Japan, the dragonfly will vanish within several years. *Subject Headings:* 1. Phenological observations 2. Dragonflies 3. Swallows 4. Japan. *Author's abstract.*

10N-599

551.506.8:595.78

Koyano, M. and Kuroiwa, S., On the date of first appearance of *Pieris rapae* in Japan, 1951. *Central Meteorological Observatory, Tokyo, Memoir of Industrial Meteorology*, 16(1):71-72, Aug. 1952. 3 figs. In Japanese; English summary p. 5.—Dates of first appearance of *Pieris rapae* in Japan in 1951 are analyzed. (1) Daily mean temperature at which first appearance took place was about 10°C along the Pacific coast and about 5°C along the coast of the Japan Sea. (2) It appeared later than usual in eastern Kyushu and in Shikoku. *Subject Headings:* 1. Insect phenology 2. Cabbage butterflies 3. Japan.—*Authors' abstract.*

10N-600

551.506.8:598.2:591.17

*Riabinin, Sergiusz, Wiosenne przyloty ptaków na terenie Lublina na tle fenologicznych zjawisk w świecie roślin. [Arrival of birds in spring in the Lublin region in relation to phyto-phenological conditions.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 7(1/2):53-60, 1954. 6 tables, 1 refs. English summary p. 60. **DWB, DLC**—A study of the time of arrival of certain species of birds carried out by the author from 1950 to 1953 in the Lublin region (E. Poland) shows that it usually coincides with definite phenomena occurring in the plant world. It has also been shown that there may be a shifting of the date of occurrence, but the coincidence remains. The dates of arrival of birds agreed, during the 3 yrs of observations, with the course of thermal conditions: the earlier the period preceding the arrival of birds, the later they came, and vice versa. Personal observations of the author as well as results of observations made in the U.S.S.R. indicate that this phenomenon is apparent, even in localities situated at a great distance from each other, and differing greatly in regard to climatic and geographic factors. *Subject Headings:* 1. Phenological observations 2. Bird migrations 3. Lublin, Poland.—*A.M.P.*

10N-601

551.586:595.7

Richard, Georgette, Contribution à l'étude des vols migratoires de *Corixidae* (insectes hétéroptères). Les vols de l'été 1957. [Contribution to the study of migratory flights of *Corixidae* (Heteroptera). Flights of Summer 1957.] *Vie et Milieu*, Paris, 9(2):179-199, 1958. 2 figs., 2 tables, 16 refs. **NN**—The catch of *Corixidae* made by the author during two yrs by means of luminous traps, is undoubtedly in connection with cyclical migratory flights of these aquatic Heteroptera. This is an indication of the climatic conditions that prompt the insects to take flight. Examination is made of the influence of temperature changes and atmospheric pressure on the warming. The author suggests that a more thorough ecological study should include an examination of the influence of winds or atmospheric currents, and of changes in atmospheric ionization upon the starting of flights. *Subject Headings:* 1. Insect flights 2. Climatic effects on insect flights. —*A.V.*

INDEX OF AUTHORS

- Abd el Rahman, A. A., 10N-486, -487
 Abe, Izo, 10N-393, -394, -476
 Ackerman, E. A., 10N-120
 Agricultural Engineering Society of Japan, Tokyo, 10N-132
 Agricultural Engineering Society of Japan, Tokyo, Journal, 10N-132
 Agricultural-Weather Forecasting Meeting, 9th, Boston, Mass., March 28, 1956, 10N-25
 Ahnert, F., 10N-207
 Aichele, H., 10N-462
 Aitay, Agnes, 10N-552
 Algèbre, G., 10N-385
 Alvarez, H., 10N-515
 Amitai, S., 10N-264
 Amstrup, N., 10N-213
 Andó, M., 10N-395
 Andrews, R. T., 10N-26
 Angus, D. E., 10N-553
 Anwar, A., 10N-573
 Ara, M., 10N-214
 Arai, T., 10N-143
 Arléry, R., 10N-539
 Arnoux, J., 10N-244, -489
 Astakhova, N. I., 10N-76
 Avidov, Z., 10N-245
 Azuma, Y., 10N-144
 Azzi, G., 10N-301

 Baba, I., 10N-396
 Bac, S., 10N-77
 Balakrishnan Nair, N., 10N-589
 Banerji, Sundhansu Kumar, 10N-21
 Bannerjee, J. R., 10N-313
 Baranov, I. Ia., 10N-111
 Bark, L. D., 10N-189
 Barry, J. P., 10N-68
 Bartlett, G. S., 10N-366
 Basu, S., 10N-1
 Beřrom, S. G., 10N-19
 Bénassy, C., 10N-246
 Berényi, D., 10N-78
 Berger, H., 10N-35
 Bider, M., 10N-184
 Bierhuizen, J. F., 10N-179, -486, -487
 Binet, P., 10N-567
 Birch, H. F., 10N-79
 Birch, W. R., 10N-51
 Blaisdell, J. P., 10N-185
 Blanc, M. L., 10N-80
 Blommaert, K. L. J., 10N-372
 Bloodworth, M. E., 10N-309
 Bloom, J. R., 10N-86

 Bodenheimer, F. S., 10N-568
 Bolhuis, G. G., 10N-386
 Bol'shakov, A. F., 10N-81
 Bongers, L. H. J., 10N-554
 Bonnemaïson, L., 10N-247
 Borisoglebskiĭ, G. I., 10N-548
 Bouchet, R., 10N-216 to -218
 Bouillenne-Wabrand, M., 10N-488
 Boulet, L., 10N-311
 Bourget, S.-J., 10N-82
 Bowen, G. D., 10N-266
 Braak, J. P., 10N-444
 Braams, B. W., 10N-330
 Brablec, J., 10N-147 to -149
 Brandtner, E., 10N-150
 Briški, A., 10N-36
 Bristow, G. C., 10N-215
 Brooker, D. B., 10N-533
 Brooks, F. A., 10N-37, -374
 Bryson, R. A., 10N-475
 Buchinskiĭ, I. E., 10N-63
 Büchi, H. F., 10N-569
 Buntrock, H., 10N-194
 Burleson, C. A., 10N-309
 Butijn, J., 10N-83, -330
 Butson, K., 10N-219

 Cahoon, G. A., 10N-99
 Calémbert, J., 10N-135
 California Geograph, [Los Angeles], 10N-248, -334, -360
 Camez, T., 10N-509
 Caprio, J. M., 10N-315
 Carlton, A. B., 10N-140
 Carney, C. B., 10N-220
 Carter, H. B., 10N-580
 Carter, H. S., 10N-52, -373
 Carton, P., 10N-594
 Caspar, H., 10N-339
 Cassin, J., 10N-359
 Cauderon, A., 10N-293
 Chadwick, L. E., 10N-570
 Chang, Yeuch-ngo, 10N-151
 Chaptal, L., 10N-53
 Chayamichi, Hisakichi, 10N-458
 Cheng, K. T. C., 10N-69
 Chernoukov, A. M., 10N-84
 Chiba, T., 10N-144, -426
 Chirkov, Iu. I., 10N-295, -296
 Clendenin, J. D., 10N-331
 Cole, M. M., 10N-38
 Collier, D., 10N-85
 Collings, G. H., 10N-377
 Contreras Arias, A., 10N-505
 Corcelle, P., 10N-306
 Corns, W. G., 10N-447
 Couch, H. B., 10N-86
 Couillaud, P., 10N-259

 Couturier, A., 10N-249
 Cowler, W. R., 10N-309
 Craigie, J. H., 10N-267
 Crawford, T. V., 10N-374
 Criddle, W. D., 10N-121
 Cross, C. E., 10N-556
 Culpepper, C. W., 10N-375
 Czenatzki, W., 10N-87

 Daigo, Y., 10N-54, -138, -397, -398
 Dantuma, G., 10N-506
 Dean, R. H., 10N-361, -362
 Decker, J. P., 10N-190
 De Fina, A. L., 10N-39
 de Jong, D. J., 10N-593
 Delbard, G., 10N-222
 de Lint, P. J. A. L., 10N-322
 Demaree, K. D., 10N-375
 Demol, J., 10N-307, -391
 Denmead, O. T., 10N-297
 de Philippis, A., 10N-186
 Dési, F., 10N-2
 De Sornay, A., 10N-454
 Desrosiers, R., 10N-571
 de Villiers, G. D. B., 10N-332, -333, -343
 de Wit, C. T., 10N-191
 de Zeeuw, J., 10N-221
 D'Hoore, J., 10N-112
 Dickson, B. T., 10N-70
 Dightman, R. A., 10N-323, -507
 Dolgoshov, V. I., 10N-555
 Dona, F., 10N-223
 Doorenbos, J., 10N-200
 Duley, F. L., 10N-64
 Durand, J. H., 10N-122
 Durquety, P. M., 10N-152

 Egberts, Ir. H., 10N-123
 Eikhfeld, I. G., 10N-3
 Eisel, Hans, 10N-491
 El Murabaa, A. I. M., 10N-485
 Escribano Isava, Fernando, 10N-477
 Evenari, M., 10N-67, -472
 Evenhuis, H. H., 10N-250, -251
 Evseev, P. K., 10N-508

 Fallot, J., 10N-492
 Farrand, R. L., 10N-572
 Fedorov, E. E., 10N-40
 Fenwick, D. W., 10N-252
 Ferber, A. E., 10N-139
 Ferguson, J. H. A., 10N-153, -468
 Feron, M., 10N-253
 Filamov, F. V., 10N-19
 Findlay, J. D., 10N-571

- anders, S. E., 10N-248
 lk, G. E., Jr., 10N-572
 rtanian, E. J., 10N-387
 rtune, [N. Y.], 10N-100
 rrré, Jeannine, 10N-448,
 -449
 rrier, P., 10N-388
 wler, R. L., 10N-268
 anc de Ferrière, P. J. J.,
 10N-478, -509
 ançois, J., 10N-308
 ankin, H. T., 10N-556
 aser, J. W., 10N-463
 ederick, R. H., 10N-224
 ey, K. J., 10N-545
 eytag, H. W., 10N-178
 ang, Kuang Ying, 10N-461
 ijikawa, T., 10N-269
 ijima, T., 10N-433
 ijita, T., 10N-399
 ijiwara, T., 10N-124
 ikuoka District, Japan.
 Central Meteorological Ob-
 servatory, 10N-225
 ukushima, Japan. Weather
 Station, 10N-226
 ukushima, Japan. Meteoro-
 logical Observatory, 10N-
 381
 unahashi, Y., 10N-428
 ushiki, Japan. Weather
 Station, 10N-345
 aastra, P., 10N-450
 aie, W., 10N-289
 aneva, B., 10N-510
 arbosky, A. J., 10N-39
 ardner, Robert, 10N-88
 ay-Bellile, F., 10N-274
 Georgieva, Ia. M., 10N-20
 Gerard, C. J., 10N-309
 Gerber, H., 10N-227
 Gerritsen, C. J., 10N-557
 Geslin, H., 10N-335
 Gesunde Pflanzen, [Frankfurt
 am Main], 10N-587
 Giesecker, L. F., 10N-41
 Gifu, Japan. Weather Sta-
 tion, 10N-27
 Gladstones, J. S., 10N-566
 Godard, M., 10N-228
 Gorlenko, M. V., 10N-511
 Grigor'ev, A. A., 10N-89
 Groenewegen, J. H., 10N-470
 Guennelon, G., 10N-253
 Guntz, M., 10N-479
 Gustafson, C. D., 10N-363
 Gutman, L. N., 10N-105
 Hafez, E. S. E., 10N-573
 Hagler, T. B., 10N-377
 Haller, M. H., 10N-375
 Halperin, J. E., 10N-182
 Halstead, Maurice, 10N-4
 Haneda, E., 10N-400
 Hanyu, J., 10N-401
 Hara, S., 10N-512
 Hardy, Margaret H., 10N-580
 Harper, H. J., 10N-324
 Harper, J. L., 10N-299
 Hartman, Th. A., 10N-513
 Hascoet, M., 10N-489
 Hasegawa, S., 10N-402
 Hashizume, A., 10N-403
 Hayashi, M., 10N-403
 Hayles, W. A., 10N-65
 Hayward, H. E., 10N-137
 Henson, W. R., 10N-254
 Hester, G., 10N-444
 Hölte, W., 10N-211
 Holmes, R. M., 10N-145
 Honda, Isao, 10N-382, -426,
 -434, -502
 Hopp, Henry, 10N-271
 Howe, E. D., 10N-137
 Hudson, J. P., 10N-183
 Huglin, P., 10N-493
 Hunahashi, Y., 10N-133
 Iakubov, T. F., 10N-208
 Ibyina, A. I., 10N-389
 Ichikawa, J., 10N-346
 Ichikawa, M., 10N-424
 Iizuka, I., 10N-336, -376, -464
 Ijuin, H., 10N-459
 Imai, K., 10N-30, -404
 Imuta, S., 10N-369
 India. Meteorological Dept.,
 10N-21
 Ingold, Marcel, 10N-298
 Inoue, E., 10N-30, -404, -405
 Inoue, H., 10N-517
 Inoue, S., 10N-403
 Ishmaev, N. E., (ed.), 10N-49
 Isohe, S., 10N-404
 Isozaki, Yoshimasa, 10N-365
 Itō, K., 10N-598
 Ivanov, A. V., 10N-19, -66
 Iwata, I., 10N-396
 Izumi, S., 10N-423
 Jägersten, Gösta, 10N-574
 Japan. Meteorological
 Agency, 10N-347, -348
 Jaramillo, A. G., 10N-558
 Jerebzooff, Stephan, 10N-270
 Jesser, E., 10N-202
 Joffe, A., 10N-316
 Johnson, E. C., 10N-224
 Jolly, Manjeet, 10N-592
 Jonkers, H., 10N-445
 Journal of Meteorological Re-
 search, [Tokyo], 10N-29
 Juarez, G. A., 10N-515
 Kakinuma, S., 10N-114, -115
 Kalisvaart, C., 10N-125
 Kamel, M. S., 10N-192, -540
 Kaneko, Ryo (ed.), 10N-132
 Kaneseki, S., 10N-406
 Kangieser, P. C., 10N-271
 Kanzaki, Y., 10N-517
 Karnatz, H., 10N-229
 Katoma, E., 10N-294
 Katz, Yale H., 10N-473
 Kawamata, M., 10N-407
 Kekukh, A. M., 10N-451
 Kelso, M. M., 10N-4
 Kennedy, Margaret M., 10N-
 269
 Kesner, Bohuslav, 10N-32
 Kibardin, R. E., 10N-494
 Kimura, Y., 10N-408
 Kirilenko, P., 10N-33
 Kiss, István, 10N-154
 Klingler, J., 10N-256
 Kment, A., 10N-575
 Kmoch, H. G., 10N-559
 Knapp, R., 10N-71
 Kobayashi, Shigeki, 10N-409
 Koch, E. J., 10N-375
 Kodaka, S., 10N-423
 Kok, B., 10N-193
 Kokole, Vladimir, 10N-42
 Kole, A. P., 10N-272
 Koller, R., 10N-576
 Kontorshchikov, A. S., 10N-
 55, 10N-514
 Korbonits, András, 10N-489
 Korte, Walter, 10N-90
 Kostermans, A. J. G. H.,
 10N-56
 Kotaka, S., 10N-517
 Koyano, M., 10N-349, -599
 Kozma, Ferenc, 10N-106
 Kraijenhoff van de Leur, D. A.,
 10N-91
 Kreutz, Wilhelm, 10N-31
 Krhounek, S., 10N-286
 Kronberg, Nathan, 10N-377
 Kronenberg, H. G., 10N-444
 Kubicek, H., 10N-155
 Kubo, S., 10N-433, -436, -437
 Kühnheit, Wilhelm, 10N-257
 Kuiper, P. J. C., 10N-179, -487
 Kulik, M. S., 10N-92, -534
 Kulín, István, 10N-57
 Kullmann, A., 10N-178
 Kumagaya, Japan. Weather
 Station, 10N-368
 Kumano, Y., 10N-350
 Kundert, J., 10N-273
 Kunkel, Günther, 10N-107
 Kurashige, K., 10N-410
 Kurihara, K., 10N-411
 Kurpelová, Margita, 10N-156,
 -157
 Kusakabe, Masao, 10N-412,
 -413
 Labeyrie, V., 10N-244
 Lafon, J., 10N-274

- Landsberg, H. E., 10N-4
 Lapa, I. Z., 10N-6
 Lapeyronie, André, 10N-544
 Lardinois, Emile, 10N-158
 Lascombes, Georges, 10N-452
 Laureano, A., 10N-515
 Lauscher, Friedrich, 10N-22
 Lecourt, Bernard, 10N-325
 Lee, D. H. K., 10N-580
 Legay, Jean-Marie, 10N-592
 Leloup, Jacques, 10N-577,
 -578
 Leuwens, A., 10N-310
 Liakhova, A. G., 10N-159
 Liebert, G., 10N-275
 Lockard, R. G., 10N-414
 Lörtscher, H., 10N-579
 Lombard, P., 10N-311
 Long, A. R., 10N-390
 Lorch, J., 10N-560
 Ludlum, David M., 10N-7
 Ludwig, J. W., 10N-299
 L'vovich, M. I., 10N-126
- Maeda, H., 10N-230
 Maghrabi, M. H., 10N-573
 Magimel, R., 10N-152
 Magnanini, R. L. da C., 10N-
 290
 Maison, P., 10N-244
 Maksimov, S. A., 10N-8
 Malan, E. F., 10N-561
 Mallik, A. K., 10N-562
 Manchin, V., 10N-24
 Mándy, György, 10N-174
 Maruyama, Eizō, 10N-58,
 -138
 Mangenot, Georges, 10N-175,
 -176
 Masatsuka, A., 10N-28
 Masson, Pierre, 10N-94
 Mastinskaia, S. B., 10N-23,
 -93
 Matiuk, I. S., 10N-66
 Matsuda, A., 10N-416
 Matsuyama, M., 10N-411
 Mattos, R. R., 10N-9
 Mayr, Erwin, 10N-43
 Mes, Margaretha G., 10N-469
 Mesároš, J., 10N-421
 Meteorological Magazine,
 [London], 10N-34
 Meteorologia i Hidrologia,
 [Leningrad], 10N-172
 Michailikov, Vladimir, 10N-
 515
 Michel, E., 10N-258
 Mikenberg, Natalio, 10N-44
 Mikhailova, E. G., 10N-19
 Mikhailova, N. I., 10N-451
 Millot, Georges, 10N-509
 Minář, Miroslav, 10N-337
 Minz, G., 10N-564
 Mironov, V. V., 10N-66
- Misawa, H., 10N-231, -351
 Miteva, Ia., 10N-300
 Mitosek, Henryk, 10N-232
 Mitsudera, M., 10N-101, -419,
 -420
 Miyamota, K., 10N-127, -426
 Mörikofer, W., 10N-579
 Mohrmann, J. C. J., 10N-128,
 -129
 Moiseichik, V. A., 10N-160
 Molga, Marian, 10N-203
 Montgomery, R. A., 10N-314
 Morel, Robert, 10N-94
 Morstatt, Hermann, 10N-259
 Morton, J. D., 10N-95
 Moscow. Nauchno-Issledov-
 atel'skii Institut Agro-Leso-
 melioratsii, 10N-66
 Mota, F. S. da, 10N-45, -301,
 -338
 Mouton, J. A., 10N-415
 Möller, H. W., 10N-302
 Müller, Kurt, 10N-546
 Mullett, C. C., 10N-233
 Murata, S., 10N-460
 Murawski, Heinz, 10N-384
- Nagaishi, Yoshitaka, 10N-130
 Nagle, A., 10N-326
 Nagy, Lajos, 10N-78, -234
 Nagy, Z. K., 10N-161
 Nakagawa, Y., 10N-417, -418,
 -435, -438
 Nakahara, Magokichi, 10N-
 131, -419, -420
 Nakayama, K., 10N-402
 Nakazawa, S., 10N-108, -131
 Naumova, N. A., 10N-276
 Nicolaes, J., 10N-307, -391
 Nicolaisen, W., 10N-194
 Nicollier, J., 10N-235
 Nishida, T., 10N-72
 Nishiuchi, H., 10N-422
 Niwa, I., 10N-432
 Nixon, Roy W., 10N-565
 Noda, K., 10N-516
 Nomizo, Z., 10N-403
 Norman, O. N., 10N-367
 Norway. Statens Kornfor-
 retning, 10N-46
 Nuttonson, M. Y., 10N-177
 Nuzhdin, A. V., 10N-84
- Ochs, R., 10N-392
 Ogorodnikov, B. I., 10N-446
 Ogusu, Z., 10N-146
 Ohashi, T., 10N-432
 Oka, Y., 10N-423
 Okadome, Z., 10N-269
 Okamoto, K., 10N-423
 Okamoto, Y., 10N-517
 Okanou, M., 10N-352, -424
 Okumura, H., 10N-370
 Okushko, A. A., 10N-549
- Ollram, F., 10N-495
 Olmstead, Clarence W., 10N-
 59
 Olson, R. V., 10N-47
 Oneda, N., 10N-124
 Onodera, F., 10N-108
 Orlov, V. M., 10N-518
 Ota, T., 10N-72
 Ota, Y., 10N-425
 Overlaet, Jos, 10N-277
 Ozawa, Y., 10N-382, -426
- Pál, Tamás, 10N-162
 Palmer, Robert S., 10N-96
 Panabokke, C. R., 10N-109
 Paquet, J., 10N-519
 Pardé, J., 10N-465
 Pascale, A. J., 10N-520, -550
 Penkov, M. D., 10N-496
 Pereira, H. C., 10N-291
 Peterson, P. D., 10N-378
 Petrov, A. P., 10N-195
 Peyer, E., 10N-497
 Piffel, E., 10N-257
 Pifflová, L., 10N-163
 Poliakov, I. Ia., 10N-260
 Pólya, L., 10N-294
 Ponchet, J., 10N-303
 Popovskaia, O. M., 10N-480
 Post, J. J., 10N-10, -470, -593
 Pradhan, S. P., 10N-590
 Prevot, P., 10N-388
 Primault, B., 10N-11, -187,
 -498, -595, -596
 Protopopova, O., 10N-33
 Protserov, A. V., 10N-97, -164,
 -521
 Pugnat, Claude, 10N-535
 Purvis, John C., 10N-377, -379
- Radinovich, N. F., 10N-73
 Raeuber, Albrecht, 10N-278
 Rafols, Wilfredo de, 10N-317
 Rahn, Hermann, 10N-570
 Ramdas, L. A., 10N-12
 Ramdas, S. A. K., 10N-1
 Razumova, L. A., 10N-93
 Remy, P., 10N-341
 Riabinin, Sergiusz, 10N-600
 Ribéreau-Gayon, Gilles, 10N-
 499
 Richard, Georgette, 10N-601
 Rieder, J., 10N-579
 Riek, R. F., 10N-580
 Riepma, P. Wzn, 10N-474
 Riewe, M. E., 10N-327
 Robb, A. D., 10N-318
 Robelin, M., 10N-85
 Robert, P., 10N-249
 Robin, M., 10N-522
 Roldan Seminario, Ernesto,
 10N-312
 Roller, Maria, 10N-13, -22
 Rollin, Paul, 10N-196

- senkranz, Friedrich, 10N-165, -319, -547
 sinha, R. C., 10N-301
 ssouw, D. J., 10N-279
 uillard, Guy, 10N-455
 usselot, R., 10N-597
 vira, A. D., 10N-180
 dnev, G. V., 10N-14
 zhkina, A. I., 10N-98

 ito, T., 10N-439
 kamoto, T., 10N-466
 mokhvalov, N. F., 10N-523
 no, H., 10N-114, -115
 nson, J., 10N-166, -167
 poznikova, S. A., 10N-508
 to, S., 10N-133, -427 to -430
 to, T., 10N-369, -407, -439
 uberer, F., 10N-168
 harringa, M., 10N-236
 hilowa, I., 10N-302
 hindler, H., 10N-582, -583
 hippers, P. A., 10N-237
 hmalz, H., 10N-197, -524, -525

 hmitt, Norbert, 10N-494
 hnelle, Fritz, 10N-169
 hober, Karl, 10N-541
 honnopp, G., 10N-15
 hoorel, A. F., 10N-204
 hremmer, F., 10N-257
 hrödter, H., 10N-261
 hütte, K. H., 10N-74
 hultz, H. B., 10N-140
 hulze, J., 10N-304
 hulze, E., 10N-328, -481
 ichet, Jean, 10N-453
 emann, J., 10N-339
 in, Abhiswar, 10N-113
 alvarov, K. A., 10N-209
 anan, L., 10N-67
 avliashvili, I. A., 10N-170
 aw, Robert H., 10N-4, -297
 imoyama, T., 10N-431, -526
 inohara, H., 10N-353, -354
 iraki, M., 10N-432
 ortridge, N. H., 10N-16
 iki, M., 10N-280
 lya, A. R. da, 10N-527
 maika, Y. M., 10N-134
 monneau, P., 10N-122
 ne, L., 10N-135
 kachkov, 10N-581
 ovenia. Hidrometeorološka Služba, 10N-24
 meets, L., 10N-355
 mid-Wiersema, A. C., 10N-198
 mith, J. C., 10N-327
 obolev, L. N., 10N-60
 ociety of Agricultural Meteorology of Japan, 10N-238

 Sommerfeldt, H., 10N-328
 Spain. Servicio Meteorológico Nacional, 10N-48
 Sreenivasan, P. S., 10N-313, -528
 Staehelin, M., 10N-344
 Stein, G., 10N-472
 Stenz, S., 10N-342
 Stöckli, A., 10N-584
 Stolzy, L. H., 10N-99
 Straus, M. W., 10N-136
 Stroun, Maurice, 10N-535
 Stryckers, J., 10N-536
 Styaszny, S., 10N-294
 Sudakevich, Iu. E., 10N-239
 Sukawa, Tsutomu, 10N-537
 Suzuki, S., 10N-240
 Suzuki, Y., 10N-397
 Swan, A. D., 10N-456
 Swirski, E., 10N-262
 Szász, Gábor, 10N-78, -542, -543
 Szilágyi, Tibor, 10N-171
 Szuszkiewicz, T. E., 10N-99

 Tadmor, N., 10N-67
 Taguchi, R., 10N-370
 Tahara, Toraji, 10N-131
 Takahashi, K., 10N-101
 Takahashi, S., 10N-476
 Takahashi, Y., 10N-396
 Takasuna, M., 10N-356, -467
 Takaya, S., 10N-380
 Takegami, S., 10N-205
 Tamhane, R. V., 10N-17
 Tanaka, S., 10N-114, -115
 Taneda, Yukio, 10N-181
 Taneja, G. C., 10N-585
 Tani, N., 10N-30, -404
 Tanizawa, T., 10N-114, -115
 Tateiski, S., 10N-516
 Téllez Molina, Ricardo, 10N-529
 Terra, G. J. A., 10N-116
 Testard, E., 10N-75
 Thibault, B., 10N-383
 Thiel, A., 10N-501
 Thom, H. C. S., 10N-4
 Thomas, David, 10N-141
 Thomas, M. D., 10N-212
 Thomson, G. M., 10N-457
 Thornthwaite, C. W., 10N-531
 Tinker, M. E., 10N-263
 Trojer, Hans, 10N-292
 Trumble, H. C., 10N-188
 Truberbill, E. A., 10N-482
 Tsuboi, Y., 10N-417, -433 to -438, -502
 Tsugawa, K., 10N-401
 Tsukamoto, K., 10N-101
 Tsukijima, Y., 10N-407
 Tsuneoka, S., 10N-101

 Tumanov, I. I., 10N-61, -364
 Tyrtikov, A. G., 10N-110

 Uehara, Masaki, 10N-365
 Uhlig, Siegfried, 10N-281
 Uhlř, Pavel, 10N-32
 Ujije, S., 10N-439
 Ulanova, E. S., 10N-18, -62, -538, -551
 Ulrich, R., 10N-530
 Umeda, S., 10N-357, -440
 UNESCO, 10N-137
 U. S. Dept. of Agriculture, 10N-117
 U. S. Plant Disease Survey, 10N-282
 U. S. Weather Bureau, 10N-255, -282
 Ural (Province). Oblastnaia Planovaia Komissii, 10N-49
 Utsunomiya, T., 10N-269
 Uvarov, B. P., 10N-264

 Vacin, E. F., 10N-320
 Vámos, Róssó, 10N-395, -441
 Vámosi, Jenő, 10N-471
 van Bavel, C. H. M., 10N-4
 Vandenplas, André, 10N-340
 Van Die, J., 10N-490
 van Dobben, W. H., 10N-198 to -200
 van Doorn, A. M., 10N-284
 van Eimern, J., 10N-275
 van Emden, J. H., 10N-283
 Van Helmont, M., 10N-289
 van Hoof, H. A., 10N-285
 Van Hoorn, J. W., 10N-102
 Van Ness, Glenn, 10N-586
 Varga, H. Z., 10N-106
 Vasil'eva, N. G., 10N-206
 Velikovský, V., 10N-286
 Venkataraman, S., 10N-531
 Ventura, E., 10N-479
 Veredchenko, Iu. P., 10N-103
 Vernisse, Jean, 10N-118
 Vidal, J. P., 10N-287
 Vink, A. P. A., 10N-119
 Vittoz, R., 10N-594
 Vlasova, V. A., 10N-482
 Vodnik, F., 10N-24
 Vogel, W., 10N-256
 Volcani, Zafira, 10N-288
 Volk, N. J., 10N-4

 Waggoner, Paul E., 10N-4
 Wang, Jen Yu, 10N-475
 Watanabe, Tadashi, 10N-442
 Watanabe, Y., 10N-532
 Weger, Nikolaus, 10N-503
 Weise, Rudolf, 10N-504
 Wellensiek, S. J., 10N-200, -321
 Wellington, W. G., 10N-265

Went, H. C. S., 10N-4
 Wesseling, J., 10N-83
 Wieringa, G. W., 10N-329
 Wiersma, J. H., 10N-200
 Wiggans, S. C., 10N-545
 Wille, H., 10N-257
 Winkler, Erich, 10N-483
 Winkler, Hugo, 10N-241
 Wolford, L. V., 10N-563
 Wooten, O. B., 10N-314
 Wormer, Th. M., 10N-392

Woudenberg, J. P. M., 10N-173, -242
 Wurgler, W., 10N-344

Yabuki, K., 10N-443
 Yamagata (Japan) Meteorological Meeting, 10N-243
 Yamamoto, R., 10N-142
 Yamamoto, T., 10N-358
 Yamazaki, H., 10N-591
 Yeates, N. T. M., 10N-588

Yonekubo, Y., 10N-28
 Yoshino, Masatoshi, 10N-563-371

Zeilinga, A. E., 10N-444
 Zelinova, N. E., 10N-305
 Zhuchenkova, K., 10N-104
 Ziennicki, St., 10N-210
 Zillmann, Karl-Heinz, 10N-484
 Zurzycki, J., 10N-201

INDEX OF SUBJECTS

Acacia blossom phenology, 10N-319
 Accumulated temperatures, 10N-473
 After-crop periods, 10N-547
 Agricultural bioclimatology, 10N-43, -52, -395, -488
 Agricultural climatology, 10N-17, -40, -41, -46, -57, -323, -419
 Agricultural ecology, 10N-177, -301
 Agricultural development, 10N-118, -119
 Agricultural hydrology, 10N-19, -91, -93, -122, -132
 Agricultural meteorology, 10N-1, -2, -4 to -6, -8 to -12, -14 to -16
 Agricultural microclimatology, 10N-57, -58
 Agrocimatic data, 10N-54, -538
 Agrocimatic regions, 10N-39, -49
 Agrocimatological data, 10N-62, -483
 Agrocimatological handbooks, 10N-55
 Agrocimatological research, 10N-61, -69
 Agrocimatological techniques, 10N-476
 Agrometeorological conditions, 10N-417
 Agrometeorological data, 10N-20 to -24, -537
 Agrometeorological decadal reports, 10N-13
 Agrometeorological forecasting, 10N-25, -26, -29
 Agrometeorological instruments, 10N-31, -32
 Agrometeorological research stations, 10N-33, -34
 Agrometeorological services, 10N-10, -18, -168

Agrometeorological stations, 10N-31, -534
 Agronomy, 10N-51
 Air drainage, 10N-373
 Air flow through rice crops, 10N-418
 Air-soil temperature relationships, 10N-202
 "Akiochi" phenomenon, 10N-427
 Alfalfa harvesting, 10N-323
 Algae, 10N-154, -554
 Alpine effects on sugar beets, 10N-452
 Alpine phenology, 10N-169
 Altitudinal effects on potato plant growth, 10N-483
 Amino acids in root exudates, 10N-180
 Animal bioclimatology, 10N-567 to -569, -571, -574 to -576
 Animal climatology, 10N-581
 Animal climatopathology, 10N-594
 Antilocust conferences, 10N-259
 Aphids, 10N-247, -258
 Apple orchards, 10N-341, -342
 Apple pests, 10N-256
 Apple trees, 10N-229, -250
 Apricot culture, 10N-343
 Apricot diseases, 10N-344
 Arctic agricultural meteorology, 10N-3
 Arid zone agriculture, 10N-66
 Arid zone climatology symposia, 10N-70
 Arid zone ecology, 10N-590
 Arid zones, 10N-134, -568
 Aridity effects on locust ecology, 10N-264
 Artificial climates, 10N-61
 Artificial fertilization of corn, 10N-302
 Artificial fog, 10N-241
 Artificial fog treatment techniques, 10N-274

Artificial radiation effects on plants, 10N-194
 Atmospheric electric fields effects on animals, 10N-569
 Atmospheric pollution effects on crops, 10N-187, -212
 Bacterial diseases of corn, 10N-288
 Bai-u, 10N-424
 Banana cultivation, 10N-560
 Barley, 10N-506, -516, -541
 Barley culture, 10N-192, -544
 Barley climates-soil relationships, 10N-543
 Barley microclimatology, 10N-542
 Barley phenology, 10N-539
 Bean beetles, 10N-244, -465
 -471
 Bibliographies, 10N-137
 Bioclimatology of silkworms, 10N-72
 Biometeorology, 10N-417
 Bird migrations, 10N-600
 Birdsfoot trefoil, 10N-316
 Blood cholesterol, 10N-573
 Blooming processes, 10N-162
 Brusone, 10N-269, -395, -441
 Buckwheat phenology, 10N-518
 Buffalos, 10N-573
 Bulls, 10N-582, -583
 Cabbage butterflies, 10N-599
 Cacao cultivation, 10N-268
 Cacao phenology, 10N-558
 Cacao tree blight, 10N-268
 Cacao yield, 10N-268
 Cambial temperatures, 10N-462
 Carbon black effects on rice paddy temperature, 10N-429
 Carbon dioxide in peach orchards, 10N-376
 Carbon dioxide measurement instruments, 10N-32

- Carbon dioxide production, 10N-190
- Caterpillars, 10N-265
- Cattle diseases conveyed by ticks, 10N-597
- Cereals, 10N-535, -536
- Chemical composition of atmosphere, 10N-211
- Cherry blossom forecasting, 10N-346, -349, -350
- Cherry blossom phenology, 10N-345, -347 to -354, -356 to -358
- Cherry trees, 10N-355, -356
- Citrus fruit, 10N-219
- Citrus fruit phenology, 10N-359
- Citrus mites, 10N-262
- Citrus orchards, 10N-262, -359, -361 to -365, -367
- Citrus pests, 10N-248
- Climate and agriculture, 10N-9
- Climate and cotton, 10N-312
- Climate and crop yield, 10N-23, -327, -420
- Climate and land use, 10N-117
- Climate and wheat, 10N-526
- Climate control, 10N-183
- Climate of East Uganda, 10N-35
- Climate of European U.S.S.R., 10N-40
- Climate of Great Plains, 10N-47
- Climate of Istria, 10N-36
- Climate of Japan, 10N-54
- Climate of Kuibyshev, 10N-23
- Climate of pasture areas, 10N-223
- Climate of Pelotas (Rio Grande do Sul), Brazil, 10N-526
- Climate of Richland County, Montana, 10N-41
- Climate of Slovenia, 10N-24
- Climate of the Rio Negro Valley, 10N-44
- Climate of Transvaal Lowveldt, 10N-38
- Climate of Trentino, Italy, 10N-223
- Climate of Ural Area, 10N-49
- Climate of Western Canada, 10N-267
- Climate of Yugoslavia, 10N-42
- Climatic changes, 10N-112
- Climatic classifications, 10N-39, -54, -60
- Climatic comparisons, 10N-53
- Climatic data, 10N-35, -43, -51, -173, -419
- Climatic data, Spain, 10N-48
- Climatic effects on apple orchards, 10N-341
- Climatic effects on aphids, 10N-247
- Climatic effects on apricots, 10N-343
- Climatic effects on barley, 10N-506
- Climatic effects on birdsfoot trefoil, 10N-316
- Climatic effects on cacao, 10N-558
- Climatic effects on cattle disease, 10N-597
- Climatic effects on cereals, 10N-535
- Climatic effects on citrus orchards, 10N-359
- Climatic effects on citrus pests, 10N-248
- Climatic effects on cockchafer, 10N-249
- Climatic effects on coffee plant yield, 10N-292
- Climatic effects on corn ripening, 10N-293
- Climatic effects on cotton fiber, 10N-307
- Climatic effects on cranberries, 10N-556
- Climatic effects on fodder plants, 10N-325
- Climatic effects on frost resistance, 10N-384
- Climatic effects on fungus diseases, 10N-269, -279, -303
- Climatic effects on grapes, 10N-499
- Climatic effects on insect flights, 10N-601
- Climatic effects on irrigation, 10N-121
- Climatic effects on lucerne cultivation, 10N-328
- Climatic effects on mice, 10N-587
- Climatic effects on mildew diseases, 10N-273, -282, -479
- Climatic effects on onion mildew, 10N-284
- Climatic effects on papayas, 10N-561
- Climatic effects on peach trees, 10N-377
- Climatic effects on peanuts, 10N-386 to -388, -391
- Climatic effects on pear trees, 10N-383
- Climatic effects on plant life, 10N-182, -185
- Climatic effects on plant nutrition, 10N-188
- Climatic effects on potatoes, 10N-477
- Climatic effects on rice, 10N-397, -415, -427, -441
- Climatic effects on rice yield, 10N-394
- Climatic effects on soil formation, 10N-109
- Climatic effects on soybean yield, 10N-394
- Climatic effects on strawberries, 10N-444
- Climatic effects on sugarcane cultivation, 10N-455
- Climatic effects on tea, 10N-459
- Climatic effects on tea yield, 10N-458
- Climatic effects on tomatoes, 10N-490
- Climatic effects on transpiration of plants, 10N-179
- Climatic effects on vineyards, 10N-493
- Climatic effects on wheat, 10N-506
- Climatic effects on wheat rust, 10N-277
- Climatic influences on soil, 10N-116
- Climatic normals, 10N-290
- Climatology of Ceylon dry zone, 10N-109
- Climograms, 10N-53
- Clubroot, 10N-272
- Cochineal insects, 10N-246
- Cockchafer, 10N-249
- Codling moths, 10N-593
- Coffee cultivation, 10N-291, -292
- Coffee cultivation climatology, 10N-290
- Coffee plantations, 10N-289
- Cold acclimatization, 10N-572
- Cold duration frequencies, 10N-338
- Cold resistance of cereals, 10N-535, -536
- Cold resistance of corn, 10N-304
- Cold resistance of vineyards, 10N-492
- Cold resistance of wheat, 10N-522
- Cold tolerance of crustaceans, 10N-589
- Compost cover influence on temperature near the ground, 10N-498
- Coordinated Crop-Weather Scheme, 10N-528
- Corn, 10N-297, -303, -304
- Corn blight, 10N-271
- Corn climates, 10N-298
- Corn cultivation, 10N-293, -300, -302
- Corn diseases, 10N-288
- Corn ecology, 10N-295

- Corn growth, 10N-295
 Corn phenology, 10N-296, -301, -305
 Corn pollen deposition, 10N-302
 Corn sowing, 10N-299
 Cotton, 10N-306, -313
 Cotton climates, 10N-310, -313
 Cotton ecology, 10N-308
 Cotton fiber, 10N-307
 Cotton fields, 10N-311
 Cotton picking, 10N-314
 Cotton production, 10N-309
 Cotton regional networks, 10N-312
 Cotton seed germination, 10N-308
 Crop ecology, 10N-177
 Crop insurance, 10N-117
 Crop surfaces, 10N-191
 Crop yield-soil moisture relationships, 10N-100
 Crop yields, 10N-183
 Crustaceans, 10N-589
 Cyclone effects on sugar crops, 10N-456
 Cyclones, 10N-454
 Czech phenological glossaries, 10N-148, -149
 Dandelions, 10N-317
 Date climates, 10N-565
 Date palms, 10N-564
 Daylight duration effects on peanuts, 10N-385
 Daylight duration effects on peas, 10N-474
 Daylight duration effects on plants, 10N-198, -199
 Daylight duration effects on potatoes, 10N-481
 Daylight duration effects on vegetables, 10N-468
 Daylight duration effects on wheat, 10N-524
 Daylight illumination effects on plants, 10N-197
 Desert agriculture, 10N-67
 Desert reclamation, 10N-66
 Desert vegetation, 10N-209
 Dew, 10N-68
 Diurnal carbon dioxide variations, 10N-376
 Diurnal soil temperature variations, 10N-106, -107
 DNC treatment, 10N-536
 Domestic animals, 10N-569
 Dragonflies, 10N-598
 Drainage, 10N-89
 Drainage planning, 10N-330
 Drainage systems, 10N-123
 Drought areas, 10N-65
 Drought damage to rice paddies, 10N-29
 Drought effects on plants, 10N-206
 Drought frequency data, 10N-45, -301
 Drought prevention, 10N-100
 Drought resistance, 10N-152
 Drought resistant wheat, 10N-515
 Dry and wet climates, 10N-112
 Dry farming, 10N-64
 Dry wind areas, 10N-63
 Dwarf French bean phenology, 10N-470
 Earthworm ecology, 10N-584
 East Malling Research Station, England, 10N-34
 Ecoclimatology, 10N-60, -594
 Eels, 10N-577, -578
 Effective day/night temperature, 10N-37
 Effective rainfall, 10N-64
 Electric hotbeds, 10N-144
 Energy budget, 10N-305
 Energy exchange earth-atmosphere, 10N-111
 Epizootics, 10N-594
 Evaporation, 10N-133
 Evaporation coefficients, 10N-482
 Evaporation control, 10N-429
 Evaporation formulas, 10N-130
 Evaporation from irrigated fields, 10N-126
 Evaporation from reservoirs, 10N-95
 Evaporation from water surfaces, 10N-164, -291
 Evapotranspiration, 10N-87, -90
 Evapotranspiration from corn, 10N-294, -297
 Evapotranspiration from tomatoes, 10N-486
 Evapotranspiration from wheat, 10N-531
 Evapotranspiration over a paddy, 10N-406
 Evapotranspiration-yield relationships, 10N-85
 Evergreen fruit trees, 10N-464
 Excessive rainfall effects, 10N-471
 Excessive rainfall effects on barley, 10N-541
 Fasting resistance of silkworms, 10N-592
 Fertilizer effects on peanuts, 10N-388
 Fertilizer effects on wheat yield, 10N-509
 Field microclimatology, 10N-73, -205, -428
 Fig trees, 10N-557
 Flanholt Experiment Station, Sweden, 10N-241
 Flume water temperature, 10N-426
 Fodder crops, 10N-326
 Fodder plants, 10N-325
 Foot and mouth disease, 10N-595, -596
 Forage crops, 10N-327
 Forecasting frost damage, 10N-231
 Forecasting rice yield, 10N-399
 Forest climate-yield capacity relationships, 10N-465
 Forest ecology, 10N-186, -465
 Forest grass cover, 10N-195
 Forest soil moisture, 10N-103
 Forest shelter belt planning, 10N-63
 Frame microclimatology, 10N-143
 Frame temperatures, 10N-143
 Freezing damage prevention, 10N-334, -361, -362
 Freezing effects on plants, 10N-220
 Freezing of sugar beets, 10N-448
 Freezing temperature dates, 10N-215, -224
 Freezing temperatures, 10N-224
 Frontal effects on microorganisms, 10N-154
 Frost alternations, 10N-234
 Frost damage, 10N-213
 Frost damage to barley, 10N-516
 Frost damage to citrus orchards, 10N-360
 Frost damage to crops, 10N-214, -225
 Frost damage to peanuts, 10N-390
 Frost damage to pears, 10N-382
 Frost damage to plants, 10N-232
 Frost damage to potatoes, 10N-237
 Frost damage to rice plants, 10N-238
 Frost damage to sugar beets, 10N-449
 Frost damage to tomatoes, 10N-489
 Frost damage to vineyards, 10N-492, -495, -500

- Frost damage to wheat, 10N-516, -517
- Frost danger, 10N-226, -239
- Frost data, 10N-228, -239
- Frost distribution, 10N-214
- Frost effects on apricot dieback, 10N-344
- Frost effects on plants, 10N-235
- Frost fans, 10N-233
- Frost forecasting studies, 10N-27
- Frost frequencies, 10N-228, -466
- Frost frequency data, 10N-45
- Frost hazard, 10N-219, -373, -378
- Frost hazard data, 10N-335, -340
- Frost heaving, 10N-94
- Frost pockets, 10N-337
- Frost prevention, 10N-228, -241
- Frost probability, 10N-46
- Frost protection, 10N-217, -227
- Frost protection methods, 10N-216, -222, -235, -331
- Frost protection of crops, 10N-242
- Frost protection of fruit, 10N-466
- Frost protection of orchards, 10N-332, -334, -335, -363, -364, -368, -374
- Frost protection of paddy rice, 10N-401
- Frost protection of pear orchards, 10N-381
- Frost protection of pineapple plantations, 10N-553
- Frost protection of plants, 10N-231, 10N-240
- Frost protection of seedlings, 10N-243
- Frost protection of vineyards, 10N-218, -491, -497, -498, -501
- Frost resistance of apple trees, 10N-229
- Frost resistance of fig trees, 10N-557
- Frost resistance of plums, 10N-384
- Frost resistance of sugar beets, 10N-447
- Frost resistance of vineyards, 10N-495
- Frost resistant wheat, 10N-525
- Fruit culture, 10N-162, -330, -337, -340, -355
- Fruit culture ecology, 10N-339
- Fruit Frost Service, 10N-334
- Fruit ripening, 10N-375
- Fruit storage, 10N-375
- Fruit trees, 10N-333
- Fungicide effects on mildew, 10N-478
- Fungicides, 10N-287
- Fungus diseases of corn, 10N-303
- Fungus diseases of fruit trees, 10N-270
- Fungus diseases of plants, 10N-275, -285
- Fungus diseases of potatoes, 10N-283
- Fungus diseases of tobacco, 10N-279
- Fungus diseases of wheat, 10N-286
- Geomorphology, 10N-112
- Germination, 10N-445, -463
- Germination of setts, 10N-457
- Grain climatology, 10N-521
- Grain crop microclimatology, 10N-542
- Grain crop phenology, 10N-538
- Grain crops, 10N-43, -164, -534, -537
- Grain drying, 10N-533
- Grape flowering forecasting, 10N-494
- Grapes, 10N-494
- Graphic presentation, 10N-57
- Grass silage, 10N-329
- Grasses, 10N-322
- Greenhouse climates, 10N-146
- Greenhouse temperatures, 10N-146
- Ground frost, 10N-236
- Ground frost prevention, 10N-221
- Ground water, 10N-19
- Ground water variations, 10N-102
- Growth chambers, 10N-145
- Hail damage, 10N-289
- Hail damage to wheat, 10N-527
- Hailstorms, 10N-527
- Hard frost, 10N-492
- Hard frost effects on corn, 10N-522
- Hay, 10N-324
- Heat balance of earth's surface, 10N-236
- Heat effects on plant protoplasm, 10N-206
- Heat loss of water surfaces, 10N-429
- Heat tolerance of cattle, 10N-588
- Heaters, 10N-553
- Hemp fields, 10N-73
- Henin erosion index, 10N-415
- Herbs, 10N-196, -201
- Hessian fly climatology, 10N-255
- Hibernation, 10N-572
- Hibernation of fruit trees, 10N-338
- High altitude climates, 10N-51
- High altitude climatic effects on animals, 10N-579
- High temperature effects on pregnancy in cows, 10N-585
- Hoar frost on plants, 10N-240
- Honesty, 10N-321
- Hormonal treatments of flower buds, 10N-216
- Humidity effects on apple growth, 10N-342
- Humidity effects on bacteria, 10N-288
- Humidity effects on corn fertilization, 10N-302
- Humidity effects on cotton picking, 10N-314
- Humidity effects on seed germination, 10N-204
- Humidity effects on seed storage, 10N-566
- Humidity effects on sheep, 10N-580
- Humification curves, 10N-178
- Humus decomposition, 10N-79
- Hydraulics, 10N-91
- Hydrologic regime, 10N-128
- Hydrology, 10N-91
- Hypothermia, 10N-567
- Ice crusts, 10N-549
- Illumination effects on forest grass cover intensity, 10N-195
- Infiltration, 10N-125
- Infrared absorption recorders, 10N-483
- Insect bioclimatology, 10N-265
- Insect ecology, 10N-257, -263, -264, -590
- Insect flights, 10N-601
- Insect microclimatology, 10N-254
- Insect migration, 10N-259
- Insect pests, 10N-253
- Insect phenology, 10N-599
- Insolation effects on migration of bean beetles, 10N-244
- Irrigation, 10N-120, -122, -128, -130, -133 to -137
- Irrigation and drainage, 10N-132
- Irrigation calculations, 10N-291

- Irrigation effects on climate, 10N-121
- Irrigation effects on frost formation, 10N-401
- Irrigation effects on humidity, 10N-126
- Irrigation effects on soil moisture content, 10N-124
- Irrigation effects on soil temperatures, 10N-124
- Irrigation effects on temperature distribution, 10N-434
- Irrigation experiments, 10N-131, -311, -414
- Irrigation requirements, 10N-96
- Japanese cedar, 10N-243
- Kagawa Agriculture College, Japan, 10N-365
- Kalanchoe, 10N-197
- Killing frost, 10N-241
- Land classification, 10N-119
- Land reclamation, 10N-116
- Late frost forecasting, 10N-28
- Late frost protection, 10N-152
- Late frosts, 10N-218, -230
- Late spring frosts, 10N-222, -227, -235, -332, -335, -340, -500
- Lavender, pests, 10N-253
- Leaf formation of corn, 10N-296
- Leeks culture, 10N-285
- Legume bacteria, 10N-266
- Lettuce, 10N-472
- Light absorption-color active components in humin fractions relationships, 10N-178
- Light effects on fungus diseases, 10N-270, -283
- Light effects on germination of lettuce, 10N-472
- Light effects on grasses, 10N-322
- Light effects on insects, 10N-591
- Light effects on tomatoes, 10N-488
- Light effects on root exudates, 10N-180
- Light effects on seed germination, 10N-196
- Light intensity, 10N-190
- Light intensity effects on dandelions, 10N-317
- Light intensity-photosynthesis relationships, 10N-450
- Light intensity spectral light effects on herbs, 10N-201
- Lightning death statistics, 10N-48
- Lilac bloom phenology, 10N-315
- Local climatology, 10N-50
- Locusts, 10N-259, -264
- Long period records, 10N-225
- Loquat trees, 10N-464
- Low growing crops, 10N-242
- Low temperature effects on crustaceans, 10N-589
- Low temperature effects on fungus diseases, 10N-270
- Low temperature effects on peach buds, 10N-372
- Low temperature effects on plants, 10N-321
- Low temperature effects on rice paddies, 10N-29
- Lucerne cultivation, 10N-328
- Lychee trees, 10N-366, -367
- Lysimeter investigations, 10N-85
- Macroclimates-vegetation relationships, 10N-71
- Macroclimatology, 10N-205
- Mammals, 10N-568
- Mangold, 10N-192
- Maple tree phenology, 10N-467
- Medlar trees, 10N-466
- Meteorological effects on apple growth, 10N-342
- Meteorological effects on foot and mouth disease, 10N-595, -596
- Meteorological effects on plants, 10N-184
- Meteorological effects on rice, 10N-416
- Meteorological effects on rose culture, 10N-318
- Meteorological effects on tea leaves, 10N-460
- Meteorological effects on vernalization, 10N-513
- Mice, 10N-587
- Microclimates, 10N-75, -504
- Microclimatic analysis, 10N-504
- Microclimatic influences on rice, 10N-435
- Microclimatic mapping, 10N-503
- Microclimatic studies, 10N-239
- Microclimatological research, 10N-69
- Microclimatology, 10N-70
- Microhydrology, 10N-81
- Micrometeorological effects on wheat diseases, 10N-286
- Micrometeorological turbulence, 10N-142
- Mildew, 10N-478
- Mildew diseases of potatoes, 10N-479
- Mildew of vineyards, 10N-274
- Mildew plant diseases, 10N-282, -284
- Mild winters-corn blight relationships, 10N-271
- Minimum temperature distribution, 10N-226
- Monthly mean climatic data, 10N-46
- Moths, 10N-591
- Mulberry trees, 10N-50, -108, -246, -368 to -371
- Night temperature effects on tomato growth, 10N-487
- Nitrogen assimilation by plants, 10N-469
- Nitrogen availability in soil, 10N-79
- Nitrogen content of soil, 10N-94, -102
- Nitrogen effects on potatoes, 10N-481
- Nocturnal cooling, 10N-226
- Nocturnal temperature effects on plant growth, 10N-469
- Nocturnal temperature effects on velvet beans, 10N-469
- Nocturnal temperature profiles, 10N-226
- Nutrition, 10N-575
- Oats, 10N-544, -545
- Observational networks, 10N-172
- Olive culture, 10N-245
- Olive fruit fly phenology, 10N-245
- Onion culture, 10N-284
- Oranges, 10N-360
- Orchard climatology, 10N-59
- Orchard heating, 10N-331, -381
- Orchard microclimatology, 10N-339, -370
- Orchards, 10N-330, -334, -335
- Orchid climates, 10N-320
- Orographic effects on wind, 10N-142
- Osmotic pressure of tea leaves, 10N-460
- Papayas, 10N-561
- Parasites, 10N-251
- Paterson's formula, 10N-465
- Pea phenology, 10N-473, -475
- Pea phytometeorology, 10N-475
- Peach climates, 10N-377, -379, -380
- Peach ecology, 10N-372
- Peach growing, 10N-378

- Peach orchards, 10N-373, -374, -376
- Peanut crop, 10N-390
- Peanut culture, 10N-386, -387, -389, -392
- Peanuts, 10N-385, -388, -391
- Pear orchards, 10N-226
- Pear tree ecology, 10N-383
- Pear trees, 10N-383
- Peas, 10N-474
- Pedological analysis, 10N-119
- Pedology, 10N-122
- Percolation, 10N-133
- Pest forecasting, 10N-260
- Phenological charts, 10N-147, -163
- Phenological cycle retardation, 10N-152
- Phenological data, 10N-147 to -149, -156, -161, -165 to -167, -170, -171, -173
- Phenological forecasting, 10N-162
- Phenological handbooks, 10N-171
- Phenological method, 10N-184
- Phenological networks, 10N-159
- Phenological observation, 10N-172
- Phenological observations, 10N-50, -150, -151, -154, -155, -158, -159, -164, -169, -231, -346, -347, -371, -598, -600
- Phenological services, 10N-168
- Phenology, 10N-153
- Phenology of winter crops, 10N-550
- Phenometric analysis, 10N-552
- Phenometry, 10N-174
- Photoperiodicity, 10N-200
- Photoperiodism, 10N-197, -199, -316, -506, -535
- Photoperiodism of cattle, 10N-588
- Photoperiodism of oats, 10N-545
- Photoperiodism of peanuts, 10N-385
- Photoperiodism of plants, 10N-189
- Photosynthesis, 10N-190, -191, -404
- Photosynthesis research, 10N-193
- Photothermographs, 10N-468
- Physiology of cows, 10N-585
- Phytoclimatology, 10N-186
- Phytopathological problems, 10N-150
- Phytotron, 10N-488
- Phytotron seminars, 10N-4
- Pine forests, 10N-463
- Pineapple plantations, 10N-553
- Plant bioclimatology, 10N-71, -347, -461, -463, -550
- Plant characteristic-climatic variable, relationships, 10N-188
- Plant climate zone classification, 10N-37
- Plant damage, 10N-220
- Plant density effects on solar energy conversion, 10N-540
- Plant density effects on solar energy conversion, 10N-192
- Plant development, 10N-153
- Plant diseases-weather relationships, 10N-260
- Plant diseases, 10N-395
- Plant ecology, 10N-35, -174, -175, -203
- Plant freezing, 10N-224
- Plant growth, 10N-84, -87
- Plant microclimatology, 10N-68, -74, -240
- Plant phenology, 10N-157, -185
- Plant physiology, 10N-211
- Plant resistance to heat, 10N-107
- Plant temperature, 10N-194
- Plant water requirements, 10N-77
- Pleistocene climate, 10N-112
- Plowing effects on soil temperatures, 10N-98
- Plowing methods, 10N-98
- Plum cultivation, 10N-384
- Plum phenology, 10N-384
- Poltava Meteorological Station, U.S.S.R., 10N-33
- Poppy capsule borers, 10N-261
- Potassium nutrition of potatoes, 10N-478
- Potato blight forecasting, 10N-280, -281
- Potato blight warning services, 10N-278, -280, -281
- Potato blight weather, 10N-278
- Potato cultivation, 10N-476, -479, -481
- Potato field microclimatology, 10N-482
- Potato pests, 10N-253
- Potato phenology, 10N-480
- Potatoes, 10N-483
- Potato row direction-crop yield relationships, 10N-476
- Potato yield, 10N-478, -484
- Potatoes, 10N-237, -283
- Potential evapotranspiration measurement techniques, 10N-181
- Poultry husbandry, 10N-52, -581, -586
- Powdery scab, 10N-272
- Precipitation, 10N-90
- Precipitation data, 10N-507
- Precipitation effects on fertilizer, 10N-324
- Precipitation effects on hay yield, 10N-324
- Precipitation effects on soil salinity, 10N-113
- Purdue Univ., Ind., 10N-16
- Rabbits, 10N-567
- Radiation penetration prevention, 10N-428
- Radish culture, 10N-485
- Rainfall data, 10N-134, -529
- Rainfall distribution, 10N-109
- Rainfall effects on cacao yield, 10N-268
- Rainfall effects on cotton, 10N-310, -313
- Rainfall effects on fertilizer efficiency, 10N-478
- Rainfall effects on Kharif Jowar, 10N-562
- Rainfall effects on root mass, 10N-559
- Rainfall effects on wheat yield, 10N-509, -519
- Rainfall probability and hay-ing, 10N-323
- Rainfall variations, 10N-97
- Raspberries, 10N-183
- Rattlesnakes, 10N-570
- Reclaimed lakes, 10N-213
- Red pepper shrubs, 10N-552
- Regional climates, 10N-49
- Regression techniques, 10N-539
- Rice, 10N-394
- Rice climates, 10N-398
- Rice crop damage, 10N-397
- Rice crop yield estimation, 10N-425
- Rice crops, 10N-395
- Rice culture, 10N-54, -127, -130, -131, -238, -393, -401, -403, -404, -407, -409, -411, -413 to -416, -419, -420, -423, -426, -430, -437, -438
- Rice ecology, 10N-430, -435
- Rice forecasting, 10N-398
- Rice growth, 10N-396
- Rice paddies, 10N-29, -396, -400, -405, -406, -410, -418, -422, -432 to -434, -436, -439, -442, -443
- Rice paddy microclimatology, 10N-400
- Rice paddy micrometeorology, 10N-417

- Rice paddy temperatures, 10N-205, -428, -429
 Rice phenology, 10N-403
 Rice planting methods—water and soil temperature relationships, 10N-411
 Rice resistance to insect damage, 10N-422
 Rice seedlings, 10N-403
 Rice yield, 10N-402, -408, -412, -414, -421, -424, -427, -430, -431, -440
 Rice yield-temperature relationships, 10N-411
 Root exudates, 10N-180
 Root mass, 10N-559
 Rose culture, 10N-318
 Runoff utilization, 10N-67
 Rye culture, 10N-547
 Rye, 10N-513
 Rye phenology, 10N-546
- Saline water utilization for irrigation, 10N-137
 Salt damage to rice, 10N-439
 Salt spray effects on rice, 10N-438
 Scab prevention, 10N-275
 Sea breeze effects on rice crops, 10N-417
 Second flowering of plants, 10N-157
 Seed bed microclimate, 10N-512
 Seed germination, 10N-204
 Seed hardness, 10N-566
 Seed moisture content, 10N-566
 Seed storage, 10N-566
 Seed viability, 10N-566
 Seedlings, 10N-144
 Semiarid regions, 10N-66, -81
 Serial publications, 10N-5
 Shading effects on solar energy conversion, 10N-192, -540
 Shelter belt effects on frost damage, 10N-238
 Shelter belt effects on irrigated fields, 10N-126
 Shelter belt protection against typhoons, 10N-407
 Sheltering theories, 10N-141
 Silage fermentation, 10N-329
 Silkworm rearing, 10N-72
 Silkworms, 10N-592
 Smudging of orchards, 10N-368
 Snow cover data, 10N-40
 Snow cover dynamics, 10N-111
 Snow cover effects on grain harvest, 10N-537
 Snow fences, 10N-140
 SO₂ effects on plants, 10N-211
 Soil, 10N-98
- Soil-air heat exchange, 10N-105
 Soil climate effects on fodder plants, 10N-325
 Soil conservation, 10N-139
 Soil cultivation methods—soil temperatures relationships, 10N-78
 Soil dynamics, 10N-85
 Soil erosion, 10N-64, -114, -115, -207, -208, -210
 Soil erosion effects on agriculture, 10N-210
 Soil erosion effects on wheat cultivation, 10N-207
 Soil erosion prevention, 10N-114, -115, -210, -362
 Soil fertility, 10N-82
 Soil formation, 10N-109
 Soil freezing, 10N-111
 Soil influence on pear trees, 10N-383
 Soil moisture, 10N-47, -77 to -79, -82, -85, -89, -95, -97, -108, -129, -330
 Soil moisture balance in chernozem, 10N-104
 Soil moisture conductivity calculation, 10N-83
 Soil moisture conductivity data, 10N-83
 Soil moisture conservation techniques, 10N-101
 Soil moisture consumption of sugar beets, 10N-451
 Soil moisture data, 10N-80, -81
 Soil moisture deficiency, 10N-96
 Soil moisture deficiency calculation techniques, 10N-76
 Soil moisture effects on cotton, 10N-309
 Soil moisture effects on forest grass cover, 10N-195
 Soil moisture effects on frost damage, 10N-237
 Soil moisture effects on fungus diseases, 10N-272
 Soil moisture effects on oats, 10N-544
 Soil moisture effects on peanuts, 10N-389
 Soil moisture effects on plant diseases, 10N-86
 Soil moisture effects on transpiration of plants, 10N-179
 Soil moisture effects on wheat yield, 10N-514
 Soil moisture effects on winter crops, 10N-551
 Soil moisture estimation, 10N-90
- Soil moisture formation, 10N-93
 Soil moisture measurement instruments, 10N-99, -101
 Soil moisture measurement techniques, 10N-80, -92, -99
 Soil moisture movement, 10N-84
 Soil moisture-nitrogen content relationships, 10N-94, -102
 Soil moisture—plant growth relationships, 10N-93
 Soil moisture requirements of fodder crops, 10N-326
 Soil moisture requirements of peanuts, 10N-392
 Soil moisture requirements of plants, 10N-87
 Soil moisture tension, 10N-88
 Soil permeability, 10N-330
 Soil physics, 10N-82
 Soil salinity, 10N-113
 Soil temperature calculations, 10N-105
 Soil temperature effects on legume bacteria, 10N-269
 Soil temperature effects on rice, 10N-422
 Soil temperature effects on winter crops, 10N-551
 Soil temperature extremes, 10N-107
 Soil temperature measurements, 10N-108
 Soil temperature regime, 10N-103
 Soil temperature-sowing depth relationships, 10N-299
 Soil temperature under straw matting, 10N-108
 Soil temperature under various covers, 10N-106, -110
 Soil temperatures, 10N-78, -82, -109, -110, -434
 Soils, 10N-208
 Solar radiation, 10N-166
 Solar radiation absorption by soil in rice paddies, 10N-443
 Solar radiation absorption by water, 10N-443
 Solar radiation effects on blood cholesterol, 10N-573
 Solar radiation effects on plants, 10N-395, -463
 Solar radiation effects on wheat seeds, 10N-511
 Soybean cultivation, 10N-197, -563
 Soybeans, 10N-394
 Spring frosts, 10N-489
 Spring temperatures, 10N-351
 Spring wheat, 10N-524
 Spring wheat cultivation, 10N-523

- spring wheat harvest, 10N-521
- spring wheat phenology, 10N-508
- spring wheat production, 10N-23
- sprinkling irrigation, 10N-128, -129, -491
- statistical methods in agro-meteorology, 10N-184
- steppe farming, 10N-14
- storm damage to crops, 10N-225
- storm frequency data, 10N-225
- strawberry blossom phenology, 10N-446
- strawberry culture, 10N-444, -445
- subirrigation, 10N-125
- subtropical climates, 10N-177
- sugar beet growth, 10N-451
- sugar beets, 10N-447 to -450, -452, -453
- sugarcane cultivation, 10N-454, -457
- sunspot cycles-crop yield relationships, 10N-442
- swallows, 10N-598
- tea cultivation, 10N-458, -459
- tea leaves, 10N-460
- telluric currents, 10N-75
- temperature control of rice paddies, 10N-429
- temperature-corn development relationships, 10N-296
- temperature correlations, 10N-393
- temperature data, 10N-366, -367
- temperature-development rate relationships, 10N-153
- temperature effects on animals, 10N-574
- temperature effects on aphids, 10N-258
- temperature effects on apple pests, 10N-256
- temperature effects on bacteria, 10N-288
- temperature effects on beets, 10N-452
- temperature effects on blood cholesterol, 10N-573
- temperature effects on bulls, 10N-582, -583
- temperature effects on cattle, 10N-571
- temperature effects on cherry seedlings, 10N-355
- temperature effects on chicken diseases, 10N-586
- temperature effects on citrus mites, 10N-262
- Temperature effects on codling moths, 10N-593
- Temperature effects on corn, 10N-298, -300
- Temperature effects on corn blight, 10N-271
- Temperature effects on corn fertilization, 10N-302
- Temperature effects on dandelions, 10N-317
- Temperature effects on date palms, 10N-564
- Temperature effects on fruit trees, 10N-162, -333
- Temperature effects on fungus diseases, 10N-272
- Temperature effects on grape flowering, 10N-494
- Temperature effects on insects, 10N-255, -257, -263
- Temperature effects on maturing peaches, 10N-375
- Temperature effects on migration of bean beetles, 10N-264
- Temperature effects on olive fruit flies, 10N-245
- Temperature effects on peanuts, 10N-385
- Temperature effects on peas, 10N-474
- Temperature effects on plant growth, 10N-202, -393
- Temperature effects on plants, 10N-203
- Temperature effects on poppy capsule borers, 10N-261
- Temperature effects on rats, 10N-575
- Temperature effects on rattlesnakes, 10N-570
- Temperature effects on rice, 10N-410, -413, -421, -423, -432
- Temperature effects on rice yield, 10N-402, -412, -440
- Temperature effects on root exudates, 10N-180
- Temperature effects on root mass, 10N-559
- Temperature effects on seed germination, 10N-196, -204, -453
- Temperature effects on seed setting, 10N-485
- Temperature effects on seed storage, 10N-566
- Temperature effects on sheep, 10N-580
- Temperature effects on silage fermentation, 10N-329
- Temperature effects on silk-worms, 10N-592
- Temperature effects on soil salinity, 10N-113
- Temperature effects on thyroid of eels, 10N-577, -578
- Temperature effects on vegetables, 10N-468
- Temperature effects on wheat, 10N-510, -512
- Temperature effects on wheat mildew, 10N-276
- Temperature effects on wheat yield, 10N-519
- Temperature-flowering date relationships, 10N-167
- Temperature inversions, 10N-337
- Temperature-leaf formation relationships, 10N-296
- Temperature-soil moisture tension relationships, 10N-88
- Temperature variations, 10N-57
- Tensionmeters, 10N-88
- Thermal conductivity, 10N-236
- Thermoregulation, 10N-579
- Thorndwaite's method, 10N-406
- Thunderstorm data, Spain, 10N-48
- Thyroid functioning of eels, 10N-577
- Thyroid of eels, 10N-578
- Tobacco cultivation, 10N-258, -279, -461
- Tomato culture, 10N-486 to -490
- Topographic effects on wheat yield, 10N-532
- Tornadoes, Oklahoma (May 1955), 10N-7
- Transpiration-meteorological elements relationships, 10N-179
- Transpiration of corn, 10N-294
- Transpiration rates of tomatoes, 10N-487
- Tropical bioclimatology, 10N-56
- Tropical regions, 10N-129
- Tropical soils, 10N-112
- Tropical vegetation, 10N-56, -175
- Tropical vegetation studies, 10N-176
- Tropics, 10N-115
- Typhoon damage, 10N-407
- Typhoon damage to crops, 10N-225
- University of Liège, Belgium, 10N-488
- Vegetable ecology, 10N-468
- Vegetables, 10N-20

- Vegetation influence on micro-climates, 10N-504
 Vernalization, 10N-321, -513, -525, -530
 Vertical humidity distribution measurements, 10N-30
 Vertical temperature distribution, 10N-434
 Vertical temperature distribution measurements, 10N-30
 Vertical wind profile measurements, 10N-140
 Vertical wind velocity distribution measurements, 10N-30
 Veterinary medicine, 10N-576
 Vineyard climatology, 10N-59
 Vineyard diseases, 10N-287
 Vineyard microclimatology, 10N-496, -502, -504
 Vineyard phenology, 10N-493
 Vineyards, 10N-492, -497, -498, -500, -501, -503
 Viticulture, 10N-491, -493, -495, -499
 Water balance, 10N-90
 Water balance of rice paddies, 10N-436
 Water balance of soil, 10N-87
 Water capacity gradient, 10N-544
 Water content of evergreen fruit trees, 10N-464
 Water deficit calculation techniques, 10N-135
 Water-feeding of oats, 10N-544
 Water levels, 10N-426
 Water resources, 10N-136
 Water sprinklers, 10N-361
 Water storage, 10N-95
 Water supply, 10N-120
 Water supply for sugar beets, 10N-451
 Water table depth-crop yield relationships, 10N-102
 Water temperature effects on rice culture, 10N-127, 10N-396
 Water temperature variations, 10N-443
 Water vapor transport, 10N-68
 Waving plant phenomena, 10N-405
 Weather and agriculture, 10N-9
 Weather-crop relationships, 10N-484
 Weather damage, 10N-21
 Weather data analysis, 10N-533
 Weather effects on citrus pests, 10N-248
 Weather effects on plants, 10N-183
 Weather effects on rice yield, 10N-424
 Weather effects on tomato growth, 10N-486
 Weather effects on wheat yield, 10N-514
 Weather-plant growth relationships, 10N-483
 Wet springs, 10N-7
 Wheat, 10N-506, -513, -516, -522, -525, -526
 Wheat bioclimatology, 10N-523
 Wheat climates, 10N-505
 Wheat cultivation, 10N-511, -515, -519
 Wheat diseases, 10N-286, -511
 Wheat fields, 10N-405
 Wheat mildew, 10N-276
 Wheat phenology, 10N-520
 Wheat production, 10N-507
 Wheat rust, 10N-267, -277
 Wheat yield, 10N-509, -514, -517, -528, -529, -532
 Wheat yield reduction, 10N-527
 Wild berry phenology, 10N-555
 Wind damage estimation techniques, 10N-141
 Wind damage to rice, 10N-433, -436
 Wind desiccation, 10N-209
 Wind effects on fruit trees, 10N-336
 Wind effects on rice field, 10N-431
 Wind effects on vegetation, 10N-209
 Wind erosion effects on soil properties, 10N-208
 Wind machines, 10N-374, -553
 Wind protection for plants, 10N-140
 Wind speed data, 10N-560
 Wind velocity effects on rice, 10N-437
 Windbreak effectiveness, 10N-138, -139
 Windbreak effects, 10N-560
 Windbreaks, 10N-140
 Winter crop sowing dates, 10N-159
 Winter crop viability, 10N-548
 Winter crops, 10N-62, -549, -551
 Winter effects on parasites, 10N-251
 Winter injury to crops, 10N-145
 Winter wheat cultivation, 10N-76, -510, -530
 Winter wheat planting dates, 10N-255
 Woolly aphids, 10N-250
 Year book of Agriculture, 10N-117

INDEX OF GEOGRAPHICAL LOCATIONS

- AFRICA**, 10N-112, 10N-175
French North Africa
 [former], 10N-565
Northeast Africa, 10N-134
West Africa, 10N-176
Cameroons, North, 10N-310
Congo, Republic of the
 [former Belgian Congo],
 10N-5, 10N-307
 Bambesa, 10N-391
Fernch Equatorial Africa
 [former], 10N-597
Guinea, 10N-359
Ivory Coast, 10N-415
Kenya, 10N-51, 10N-291
Morocco, 10N-311
 Rharb Plain, 10N-118
Nile River, 10N-134
Rhodesia
 Gwanda District, 10N-95
Sahara, West, 10N-122
Uganda, East, 10N-35
Union of South Africa, 10N-332, -343
 Cape Province, 10N-333
 Transvaal, 10N-38
ASIA
Ceylon, 10N-109
Formosa (Taiwan), 10N-151
India, 10N-12, -21, -113
 -528, -562
 Akola, 10N-313
 Nagpur, 10N-313
 Poona, 10N-1, -531
Indochina, 10N-320
Israel, 10N-245
 Jordan Valley, 10N-560
 Negev Desert, 10N-67
Japan, 10N-29, -50, -54,
 -58, -114, -115, -130,
 -131, -132, -269, -351,
 -371, -397, -398, -407,
 -424, -426, -427, -428,

- 429, -430, -459, -467,
-512, -598, -599
Aikawa, 10N-358
Akita Prefecture, 10N-357
Chiba Prefecture, 10N-403
Fukui Prefecture, 10N-230
Fukuoka Prefecture, 10N-225, 10N-413, 10N-416
Fukushima Prefecture, 10N-226, -440
Fushiki, 10N-345
Gifu Prefecture, 10N-27
Haruki River Area, 10N-422
Hokkaido, 10N-442
Iwate Prefecture, 10N-412
Kagawa Agric. College, 10N-365
Kamikawa District, 10N-399
Kanto District, 10N-347, 10N-349, 10N-402
Kanto Region, 10N-348
Kichijoji, 10N-346
Konosu District, 10N-423
Mishima, 10N-418
Miyagi Prefecture, 10N-214, -439
Mizusawa Obs., 10N-537
Mogi, 10N-466
Morioka, 10N-394
Nagano Prefecture, 10N-28
Oita Prefecture, 10N-369
Okayama Prefecture, 10N-380, 10N-527
Osaragi, 10N-243
Sado Island, 10N-419
Shichigashuku Village, 10N-127
Shimabara Peninsula, 10N-516
Shimomoseki, 10N-350
Shizuoka Prefecture, 10N-425
Suwa Basin, 10N-409
Taisho, 10N-420
Tohoku District, 10N-393, 10N-410
Tokorozawa District, 10N-517
Tokyo 10N-108, -346, -352, -502
Uji City (Kyoto Prefecture), 10N-460
Korea, 10N-354
U.S.S.R. (in Asia), *see also*
U.S.S.R. *under*
EUROPE
- Kazakhstan, 10N-104
Northern Kazakhstan, 10N-523
Kirghizia
Terskei Ala-Tau range, 10N-60
Siberia (Asiatic S.F.S.R.)
Altai Territory, 10N-19
Igarka Region, 10N-110
Krasnoyarsk, 10N-103
Western Siberia, 10N-62
AUSTRALASIA
Australia
Queensland, 10N-326, 10N-553, 10N-580
Indonesia, Republic of
Borneo, 10N-56
EUROPE
Austria, 10N-13, -165, -168, -202, -319, -483, -495, -547
Innsbruck, 10N-43
Linz, 10N-22
Petzenkirchen, 10N-155
Vienna, 10N-257
Belgium, 10N-135, 10N-277, 10N-340
Liège, Univ. of, 10N-488
Uccle, 10N-158
British Isles
England, 10N-65
East Malling Research Station, 10N-34
Wales, 10N-141
Bulgaria, 10N-510
Dubrudja, 10N-300
North Bulgaria, 10N-496
Czechoslovakia, 10N-157, -163, -421
Hodonin (Moravia), 10N-148
Plumlov (Moravia), 10N-147, -149
Slovakia, 10N-156
Denmark, 10N-213
France, 10N-216, -246, -293, -385, -493
Cognac, 10N-274
Grignon, 10N-94
Limagne, 10N-85
Limagne Plain, 10N-519
Maule, 10N-539
Montpellier, 10N-228
Neuville-on-Seine, 10N-218
Paris, 10N-166, 10N-167
Urville, 10N-218
Germany (general and undetermined), 10N-546
Democratic Republic
[East Germany]
- Gross Lüsewitz, 10N-278
Völkenrode, 10N-98
Federal Republic, 10N-281
Bonn, 10N-328
Meckenheim, 10N-339
Rhineland, 10N-500
Rhine-Main lowlands, 10N-150
Hungary, 10N-2, 10N-161, 10N-441, 10N-489, 10N-542, 10N-552
Debrecen, 10N-234
Dobruja, 10N-20
Szeged, 10N-57
Italy
Trentino, 10N-223
Netherlands, 10N-91, -173, -191, -200, -242, -250, -251, -285, -470, -557
Boskoop, 10N-123
Drenthe, 10N-237
Zuidersee, 10N-125
Norway, 10N-46
Poland, 10N-77, -203, -210
Lublin, 10N-600
Puławy, 10N-232
Spain, 10N-48, 10N-529
Vitoria, 10N-477
Sweden
Flanholt Experiment Station, 10N-241
Switzerland, 10N-11, -256, -497, -498, -584, -595
Valais, 10N-344
Central Valais, 10N-235
Wädenswil, 10N-273
Trieste
Istria, 10N-36
U.S.S.R. (general and European), *see also* **U.S.S.R. under ASIA**, 10N-8, -14, -18, -55, -61, -66, -89, -93, -164, -172, -305, -494, -508, -521, -534, -549, -555
Caspian Depression, 10N-81
Caucasus
Eastern Caucasus, 10N-170
North Caucasus, 10N-97
European U.S.S.R., 10N-40, 10N-480
Southeastern European U.S.S.R., 10N-160
Georgia, 10N-364
S.F.S.R.
Kamennia Steppe, 10N-126

- Kuibyshev, 10N-23
 Moscow, 10N-482
 Murmansk Region, 10N-3
 Stalingrad Region, 10N-159
 Tula Region, 10N-518
 Ural Region [former], 10N-49
 Zagorsk (Moscow Region), 10N-111
 Ukraine, 10N-6, -63, -97, -239, -451
 Poltava, 10N-33
Yugoslavia, 10N-10, -42, -171
 Slovenia, 10N-24, -280
NORTH AMERICA
Canada
 Western Canada, 10N-267
 British Columbia
 Vancouver Island, 10N-265
 Ontario
 Petawawa Forest Experiment Station, 10N-463
Mexico, 10N-505
United States, 10N-59, -120, -255, -282, -331, -563
 Central United States, 10N-215
 Great Plains, 10N-47, -100
 Midwestern United States, 10N-207
 New England, 10N-96
 Northwestern United States, 10N-64
 Rio Grande Valley, 10N-309
 California
 Southern California, 10N-248, 10N-360
 Wheatland, 10N-374
 Florida, 10N-219
 De Land, 10N-361, -362
 De Soto City, 10N-367
 Georgia, 10N-52, -373
 Indiana
 Purdue Univ., 10N-16
 Kansas
 Udall, 10N-7
 Massachusetts, 10N-271, -556
 Minnesota, 10N-263
 Missouri
 Columbia, 10N-533
 Montana, 10N-315, -323, -507
 Richland County, 10N-41
 New York State, 10N-224
 North Carolina, 10N-220
 Oklahoma
 Blackwell, 10N-7
 Stillwater, 10N-324
 South Carolina, 10N-379
 Texas
 Angleton, 10N-327
 Wisconsin
 Madison, 10N-473, -475
SOUTH AMERICA, 10N-112
Argentina, 10N-44, -520
 La Pampa Province, 10N-39
Brazil, 10N-290
 Rio Grande do Sul, 10N-301, -338
 Pelotas, 10N-45, 10N-526
Chile, 10N-107
Colombia, 10N-292
 Cauca Valley, 10N-558
Ecuador, 10N-268
Peru, 10N-312
OCEANS, SEAS AND ISLANDS
Indian
 Mauritius Island, 10N-454, -455, -456

SELECT LIST OF PERIODICALS

Note: This list contains the titles of the periodicals which regularly contain material on meteorology or geophysics and it comprises only a small percentage of the periodicals from which pertinent articles are abstracted. The form of serial entry adopted is given in bold face type below.

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TABLE OF CONTENTS

Meteorological Abstracts and Bibliography, Volume 10, 1959

Supplement Number 3 (Pub. May 1962)

(Final issue of Vol. X)

AGRICULTURAL METEOROLOGY

INTRODUCTION	2595
AGRICULTURAL METEOROLOGY	2596
Agricultural meteorology (general)	2596
Agrometeorological data	2599
Agrometeorological forecasting	2600
Agrometeorological instrumentation and measurements	2602
Agrometeorological research stations	2602
LOCAL CLIMATOLOGICAL DATA, MICROCLIMATES	2602
Local climates	2602
Agricultural climatology	2606
Dry and arid climates	2608
Microclimatology	2609
SOIL CLIMATE	2611
Soil moisture	2611
Soil temperature	2618
SOIL AND CLIMATE IMPROVEMENT	2620
Soil improvement, land planning, land cultivation	2620
Irrigation	2622
Wind protection, windbreaks	2626
Greenhouse climate	2627
PLANT GEOGRAPHY AND PHYSIOLOGY	2628
Plant phenology	2628
Plant ecology	2633
Plant physiology, anatomy	2634
Growth, harvest, yield	2635
EFFECT OF CLIMATE AND ITS ELEMENTS ON PLANTS	2635
Climatic effects (general)	2635
Photoperiodism, photosynthesis, radiation	2636
Temperature	2640
Wind	2641
Atmospheric pollution	2641
Frost and freeze damage	2642
PARASITIC PLANT DISEASES	2648
Animal vermin, pests, etc.	2648
Plant bacteria, fungi, etc.	2653
SPECIFIC CROPS	2658
ATMOSPHERIC CONDITIONS AND ANIMALS AND INSECTS	2722
Animals	2722
Insects	2726
EPIDEMIC DISEASES OF ANIMALS	2727
ANIMAL AND INSECT PHENOLOGY	2728

AUTHOR AND SUBJECT INDEXES

Index of Authors	2730
Index of Subjects	2734
Index of Geographical Locations	2742